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NATURE OF FLUTTER AND FIBRILLATION OF THE AURICLE.

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PHYSICIAN TO THE STAFF OF THE MEDICAL RESEARCH COUNCIL; PHYSICIAN TO UNIVERSITY COLLEGE HOSPITAL, LONDON; HONORARY CONSULTING PHYSICIAN TO THE MINISTRY OF PENSIONS.

LECTURE I.—AURICULAR FLUTTER.

[AFTER some introductory remarks, in which he mentioned as his co-workers Dr. Thomas Cotton and Dr. A. N. Drury, of this country; Dr. H. S. Feil, Dr. W. D. Stroud, and Dr. H. A. Bulger, of the United States; and Dr. C. C. Iliescu, of Bucharest, Dr. Lewis proceeded:—]

SOME NORMAL FEATURES OF THE CONTRACTION PROCESS.

Let me first briefly describe the relevant events when normal heart muscle contracts in response to a natural or artificial stimulus. The first event of which we possess knowledge is that it passes into what is termed the *state of excitation*. By this we mean that the muscle develops a charge, just as a battery develops a charge, and that currents flow through it and the surrounding tissues. The charge is such that the active muscle becomes relatively negative to that which is still inactive, in the sense that the zinc terminal of a copper-zinc battery is negative to the copper. These electrical changes, associated with muscular activity, are of sufficient magnitude to be recorded by means of sensitive instruments, and they yield the pictures now spoken of as electrocardiograms. The electrical change in the muscle is the immediate precursor of contraction[1]; first the muscle becomes excited (or charged), secondly it contracts. The two events are separated in the mammalian auricle by a small time interval of three-hundredths of a second or less.

Now the process of excitation is not simultaneous in all parts of the muscle; it begins at the point first stimulated and spreads from this point. Stimulate a point in the centre of a sheet of muscle and the wave spreads concentrically, as does the ripple on the surface of a pond into which a pebble is thrown. It is conducted from one muscle element to the next as a wave, which is termed the *wave of excitation*. Similarly with the contraction process itself; this also spreads as a wave which accurately follows the course travelled by the wave of excitation. It may be likened to the second ripple on the pond. For our present purposes and to simplify the conception we may regard these waves as one, signalling itself as it proceeds, first electrically (first ripple), then mechanically (second ripple). When, therefore, I speak of the wave of excitation in the auricle and of the course it takes, you may picture in your minds the wave of contraction without fear of serious misconception. Nevertheless, I should, perhaps, be guilty of inaccuracy if I spoke of the wave of contraction, because our studies have been mainly, though not exclusively, directed to the wave of excitation; for movements of the latter are to be recorded with far greater accuracy than movements of the former.

Movement of the excitation wave is recorded by connecting a sensitive galvanometer directly to the surface of the muscle. As the wave passes the chosen point the galvanometer yields a sharp deflection, and this may be photographed and accurately timed against the events in some other region of the muscle. I do not propose in the present lectures to enter upon a detailed description of this delicate method, but am content to declare that we can time the arrival of this excitation wave at any point of the muscle surface with such accuracy that the error is no more, and usually less, than one-thousandth of a second; that by using two or more recording instruments simultaneously we can trace out the paths taken by waves of excitation as they travel through the muscle; and that we can estimate very accurately the time lost in the passage from point to point in different circumstances.

The wave of excitation, the first of the contraction process, travels until it involves the whole surface of the muscle; it travels in every available direction until it has exhausted all tracts of responsive muscle. Starting in the centre, it travels until it comes to the boundaries; there it ends, for at the boundary it finds no further tracts of responsive muscle through which to pass. Appropriately you may liken the spread of the excitation wave to the flame of a prairie fire. It spreads concentrically wherever it finds inflammable material; it cannot return over its scorched wake, neither can it proceed when it reaches the bounds of the dried acres. The wave of excitation leaves the muscle over which it passes in a non-inflammable, or, as it is termed, *refractory state*, and that muscle is incapable of carrying a second wave of excitation until its original inflammable state is restored. The period during which this restoration is effected is called the *refractory period* of the muscle; in the natural beating auricle of the dog it lasts from a fifth to a tenth of a second; its duration is approximately the same as the duration of the contracted state of the muscle.

From these preliminary observations I pass to what may be termed the "ring experiment."

THE RING EXPERIMENT.

The ring experiment was first performed by Mayer in 1908; he used the contractile bell of the jelly-fish and subsequently he utilised rings of muscle cut from the ventricles of turtles. His experiments were repeated and amplied by Mines in 1913 upon rings of muscle cut from the auricles of teleostean fishes. In 1914 both Mines and Garrey reported that they had obtained similar effects in rings of muscle cut from the dog's ventricle.

The experiment from our present standpoint is fundamental; I shall describe it therefore in some detail.

Suppose that we stimulate a ring of muscle, such as is depicted in Fig. 1, at *a*, the centre point of its lowest quadrant, and start in it by means of a single shock a wave of excitation. This wave, as soon as it has involved the whole cross section of the ring, develops two crests, which travel rapidly along the two limbs of the circle until, as shown in the serial diagrams (Fig 1. *1–4*), they meet at point *b*, the centre point of the highest quadrant. At the instant the crests meet the whole ring has become involved by the wave; the whole has passed into a state of excitation; it has all become "refractory." When, therefore, the two crests meet at point *b* movement is brought to an end; like two waves of flame, two waves of excitation meeting do not over-ride, each crest forms an impassable barrier to the other. The ring of muscle remains in this state of excitation for a period and then recovers. It recovers in the order in which it has become involved, it begins to be "responsive" in its lowest quadrant (at *a*) first of all. The wave of "responsiveness" travels similarly as two crests along the two limbs of the ring (Fig. 1, *5–8*) until they also meet and coalesce at *b*, the centre of the highest quadrant. The ring of muscle has now returned to its original condition; it is once again wholly in the responsive state.

Such is the series of events when the muscle of the ring responds to a single stimulus. If the ring is stimulated by means of slow rhythmic shocks each shock awakens a like series of events, providing that the intervals between the shocks are amply sufficient to permit recovery. Each stimulus yields a double-crested wave of response, which ultimately involves the whole ring. It will be evident that if in rhythmic stimulation the second shock falls upon the ring while it is in the

[1] That the electrical change precedes the contraction is at the moment the accepted view, though the interval is acknowledged to be very short.

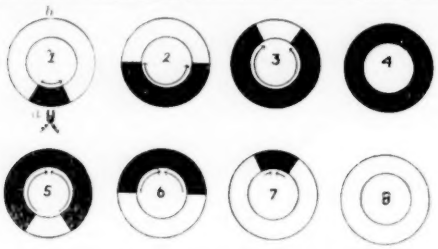

FIG. 1.—A diagram illustrating the progress of a single wave passing through a ring of muscle as a result of stimulating it at *a*. The black portion of the ring represents the refractory state, and the figure shows its progress through the ring till it involves the whole (*4*); later the figure shows its subsidence.

condition represented by Fig. 1, *6*, a fresh wave may be propagated at *a* before the response to the first shock has subsided at *b*. In such circumstances two waves will be moving through the ring at one time, as depicted in Fig. 2, *6–8*.

We come now to a different form of reaction; it is that which especially concerns us. It happens when the rate of rhythmic stimulation is raised to a critical point—namely, when the intervals between the shocks are such that each falls on the muscle at a time when responsiveness in this muscle has not wholly recovered. In such circumstances the wave propagated by stimulation may be unable to travel with its usual freedom in all directions. From time to time it is found that a wave propagated from the point of stimulation can pass in one direction only. It starts well enough, perhaps, and reaches two points of the ring A and B (Fig. 3); but at *A* it finds the muscle still insufficiently

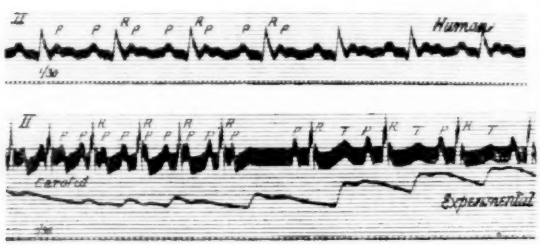

FIG. 4.—Examples of auricular flutter, clinical and experimental. The upper or clinical curve was taken from a patient in whom flutter was continuous. The auricle (*P*) is beating at a rate of 228 per minute and regularly; the ventricle (*R*) at half that rate. The ventricle responds to alternate beats of the auricle; the beat of the auricle to which there is no response falls with the beat of the ventricle. The lower or experimental curve shows the end of a period of flutter and the return of the normal rhythm. The *first half* of this curve is to be compared with the upper curve. During the period of flutter the auricle (*P*) is beating rapidly and regularly; the ventricle (*R*) at half the rate. The ventricle responds to alternate beats of the auricle; the beat of the auricle to which there is no response falls with the beat of the ventricle.

responsive, while at B recovery is more advanced. At A progress comes to an end, while at B the crest continues to move. Suppose that at this instant stimuli are withdrawn; the conditions are peculiar. Instead of two crests advancing to meet and interfere, there is now but one, and it is free to circulate, for as it comes to each new segment (C, D, E) of the ring it finds this segment excitable (Fig. 3, *2* to *4*). The single-crested wave consequently progresses around the whole ring, and, coming back to its starting-point, finds that this muscle also has recovered (Fig. 3, *5*); it proceeds so long as the conditions remain unaltered; it continues its course as a circulating wave which has no ending (Fig. 3, *6* to *10*). Thus it has been shown that, the conditions being nicely controlled, the last stimulus of a series may originate, not a single response of the ring, but an unlimited series of responses. Mines saw the wave continue to circulate for minutes, Mayer saw it continue for very many hours; this is what is meant by circus movement; it is constituted by a wave of response, which travels continuously along a re-entrant path of muscle.

FIG. 2.—A second stimulus enters the ring while it is in the condition shown in Fig. 1, *6*. While the first wave is subsiding the second wave spreads.

AURICULAR FLUTTER.

We may now examine a condition of the mammalian auricle, to-day called auricular flutter. Flutter, as we

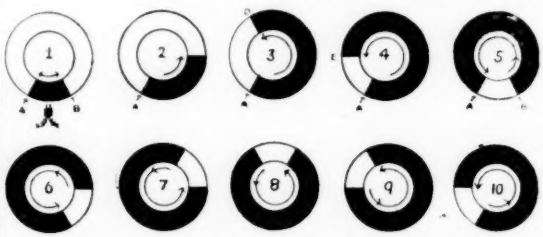

FIG. 3.—A diagram to illustrate the establishment of a circus movement in a ring of muscle. The ring is stimulated in its lower quadrant and the wave spreads to A and to B. At A it is blocked, but from B it continues around the ring. When it arrives at E (*4*) the refractory state at A is passing, and so the wave continues to travel around the circle (*5–10*).

now understand it, was first clearly described in a patient by Hertz and Goodhart in 1909; they studied their case by means of venous curves, showing the auricle to be beating continuously and regularly at a rate of 234 per minute. Their description was quickly followed by the more ample records of Jolly and Ritchie, and of other writers. The rate of the auricular beating in flutter is from 230 to 350 per minute; the action of this chamber is remarkable, not only for its high rate, but for its regularity. It is to be recognised with the greatest certainty in electrocardiograms, of which examples are shown in Figs. 4 and 5. The condition is also remarkable because it continues uninterruptedly for long periods of time. Sometimes it may occur in short paroxysms, more usually it comes to stay for months or years. Its nature until quite recently has remained altogether mysterious, though very numerous observations have indicated its close affinity to the condition called fibrillation. Thus flutter is often converted into fibrillation by the administration of digitalis. There have been few satisfactory records of a similar experi-

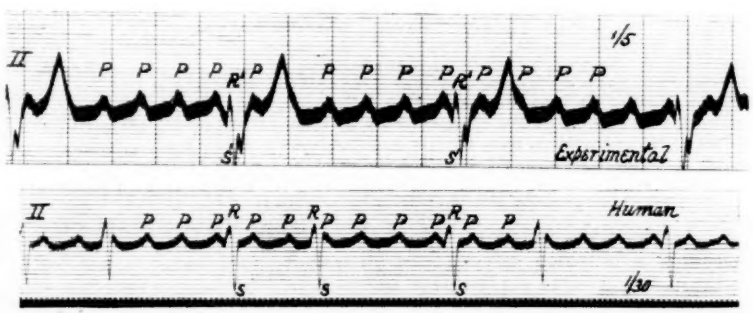

FIG. 5.—Examples of auricular flutter, clinical and experimental. The upper or experimental curve was taken from a long period of experimental flutter. The auricle (*P*) is beating regularly and continuously at a rate of about 350 per minute; the ventricle (*R S*) is beating much more slowly. The lower curve is from a patient in whom flutter had persisted for many months. The auricle (*P*) is beating regularly and continuously at a rate of about 270 per minute; the ventricle (*R S*) is beating much more slowly.

mental condition. The term "flutter" was used by McWilliam as early as 1887; that was in the days when the two conditions, flutter and fibrillation, were not definitely distinguished. The first electrocardiograms of experimental flutter—and these curves are alone really distinctive—have been obtained during the past few years. We are now certain that a condition identical with that found clinically may be produced experimentally in the dog's auricle; this we have been taught by clinical and experimental electrocardiography.

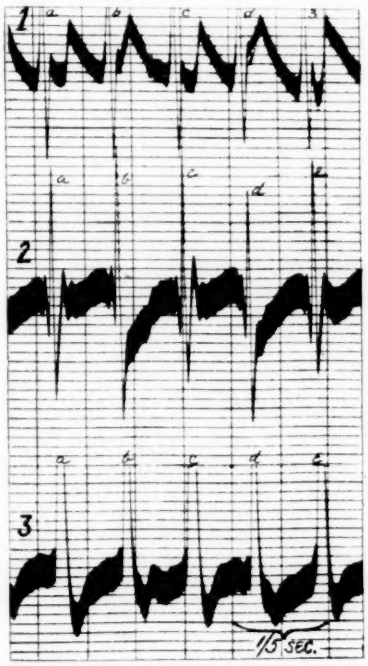

FIG. 6.—Three electrograms recorded simultaneously from the tænia terminalis of a dog while the auricle was fluttering. The top curve (1) was taken from the inferior caval, the bottom curve (3) from the superior caval, and the centre curve (2) from the mid region of the tænia. The record corresponds to five cycles of flutter (*a–e*). As each excitation wave passes, it signals itself by means of a sharp upward movement of three recorders. Recorder *1* moves first, recorder *2* a fraction of a second later, and recorder *3* a fraction of a second later still. The order of excitation is 1, 2, and 3; the wave is passing up the tænia.

In investigating disease there is one well-known and most fruitful method of approach—it is to produce in animals a condition identical with that seen in the patient. When this has been accomplished it becomes possible to inquire into the precise nature of the disturbance. If and when that knowledge is obtained we are in a position to consider rational plans of treatment. As I have related, in the case of flutter of the auricle, the first step has been taken. A continuous and rapid action of the dog's auricle can be produced in several ways, notably by rhythmically stimulating the organ with induction shocks at a rate of 300 to 600 per minute. The auricle is driven rhythmically and rapidly for a few seconds, and the stimuli are then abruptly withdrawn. In a certain proportion of such experiments a rapid action of the auricle continues after stimulation has ceased. The rate of action is not usually that of the rhythmic shocks which provoked it; it is usually less. For the moment our chief concern is not the method of producing this rapid and continuous action, but its nature. Its nature is variable, but amongst the after-effects of stimulation a condition identical with clinical flutter is seen from time to time. It is not every auricle which is predisposed to flutter; it is not every stimulation which will invoke flutter in the predisposed organ. That, however, is immaterial, providing that we can produce it, and can be certain when it is produced that it is identical with the clinical condition. The electrical curves, clinical and experimental (Figs. 4 and 5), leave us with no doubt on this subject: these curves, so delicately analytical, place the conclusion beyond question.

Experimental flutter having been produced, its nature is investigated by mapping out the path taken by the excitation wave while flutter is in progress. A single illustration of method will perhaps suffice. The auricle of a dog has been forced into a state of flutter, as ascertained by electrocardiograms taken by methods comparable to those used clinically. The flutter continues uninterruptedly. Three points are now chosen in the line of the tænia terminalis, and to each of these a sensitive galvanometric recorder is connected. The curves of these recorders write simultaneously. (Fig. 6.) As the excitation waves flow through the muscle they pass beneath the several contact points, and at each the passage is signalled. The curves, considered together, show that each wave is passing regularly up the tænia from the region of the inferior to the region of the superior cava, and we are able to measure the rate at which it is travelling. This record is published to illustrate the orderly character of the events as the cycles are repeated, and to indicate with what certainty the direction taken by the excitation may be ascertained. Actually a slightly different plan of campaign to that described is usually adopted. It consists of maintaining one lead as a standard and moving a second to various

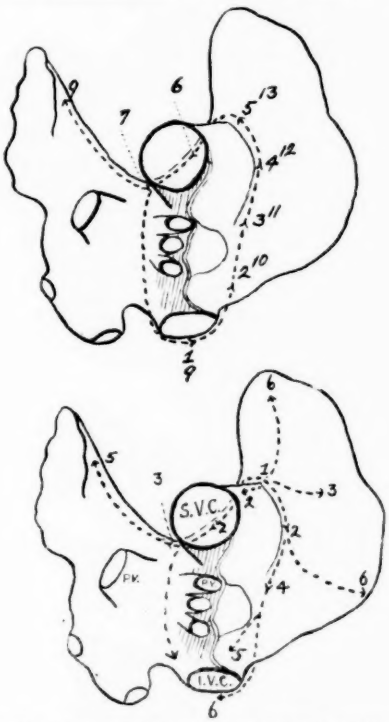

FIG. 7.—A natural outline of a dog's auricle, showing the paths of the excitation wave (broken lines) while the heart beats naturally (lower diagram) and during flutter (upper diagram). The numbers indicate the approximate order in which various parts of the musculature received the excitation wave.

points of the auricle, timing the arrival of the excitation wave at its several parts relative to the standard lead, and finally of its arrival at the several parts relative to each other. To exemplify in a simplified fashion a complete experiment I may use Fig. 7. This figure shows the natural outline of the auricle as it is seen from above. The two appendices project upwards in the diagram: the superior and inferior venæ cavæ are represented as transsected. The figures *1*, *2*, and *4* in the lower diagram lie on the tænia terminalis. The

order of excitation displayed by this animal while the heart beats normally is indicated in the lower diagram by the figures *1*, *2*, *3*, *4*, &c. The excitation wave, as is usual when the heart beats normally, starts in the region of *1*, the point at which the sino-auricular node or "pacemaker" lies. A little later it is to be found simultaneously at the points marked *2*. Follow the numerals and you perceive the course which it takes. It flows simultaneously along the muscular paths which radiate from the region of the node. Thus, it flows down the tænia to the inferior cava; it flows from the base to the tip of the right appendix; it flows through the intra-auricular band to the left auricle, and, still flying from its point of origin, traverses the left appendix from its base to its tip. The wave is not visible as a wave; it travels too fast for that; the whole process of spread occupies the twentieth part of a second.

In the top diagram of the figure is the essential part of the map for the same auricle in a state of rapid flutter. The order of excitation is quite different. The wave is first traced at the inferior vena cava (*1*), and it passes up the whole length of the tænia (*2*, *3*, *4*, and *5*). Reaching the top of the tænia it moves around the superior cava and flows through the intra-auricular band (*6* and *7*) to reach the left auricle. It reaches the left appendix (*9*), and at the same instant a wave is timed to emerge from the inferior vena cava (*9*). The question which at once arises is whether this second wave, emerging from the inferior cava and repeating the course (*10*, *11*, *12*, *13*, &c.) of the first wave, is a new wave, or whether it is the continuation of the old one. Is there a succession of regular waves, each arising de novo in the inferior cava, or is there a single circulating wave? This question is answered by two considerations. If we propagate a wave artificially from the inferior cava this spreads equal distances in equal times; it arrives at the two points *4* and *7* simultaneously. That is not the case in flutter; here it passes through point *4* to reach point *7*. But the decisive argument is found in the time relation of the wave; knowing the rate at which it travels along its path (*1*, *2*, *3*, *4*, *5*, *6*, and *7*) we can calculate how long it should take to move from *7* to *9*, and can compare this calculated time interval with the actual interval observed; these are found to be the same within an inconspicuous margin of error. There can be no doubt, then, that we are dealing with a wave which circulates. It circulates in this experiment around a natural ring of muscle formed by the orifices of the two venæ cavæ. Looked at from above, the movement is in the opposite direction to the hands of a clock. In this instance it completed one circuit in 0·16 of a second; it completed, therefore, 380 circuits in one minute, and that was the rate at which the auricle beat.

The experiment which I have described is one of several, but it will suffice to illustrate the kind of evidence we possess of circus movement in the auricle. Flutter consists essentially of a continuously circulating wave. The path which this central or re-entrant wave usually takes is the one I have described, but that is not invariable. Sometimes in flutter the course is different; thus, the flow may be clockwise over the same route. In other cases only one cava is encircled; the path is shorter, and the circuits are more quickly completed consequently. In other cases, though these are not so clearly evidenced, the circus movement is around other natural orifices, such as the mitral orifice. These variations are chiefly of consequence because they render the experimental work more difficult: the important conclusion is that the wave can be shown to circulate when the auricle flutters. The proof of circus movement in the auricle is not confined to the class of experiment which I have cited; there is much more evidence that I can now give you; taken as a whole I believe it to be quite conclusive.

Now the wave as a whole is not, of course, confined to the central or re-entrant path; as it passes along this path offshoots are sent through the appendices to their tips and into all other regions of the auricular muscle. Thus the movements of the whole auricular tissue is controlled by the circulating wave. There is the central or mother-wave, and there are its centrifugal offshoots into the remaining tissue.

Such is flutter as it occurs in the dog; such, therefore, is flutter as it occurs in man. In the dog we may see flutter last for hours; in man it may last, not for hours, but for years. I have known it to continue unceasingly for as long a period as seven years; for all we know it may continue even longer. A single wave continuously circulating for seven years: that, perhaps, may seem to be a remarkable conclusion; nevertheless, it is one we are now bound to accept.

THE FACTORS CONTROLLING FLUTTER.

A condition comparable to clinical flutter may, then, be produced in experiment; we have seen that when this experimental flutter is investigated it proves to consist essentially of a circulating wave. We may next consider the precise factors which maintain this circus movement. Refer back to the diagrams of the ring experiment and it will be clear that three factors are involved. They are:—

1. The length of the central path.
2. The rate at which the wave travels.
3. The duration of the effective refractory period.

It must be evident that if the wave is to continue circulating a gap must exist between the crest of its advance and the wake of its retreat. As the crest travels it must always find the muscle which it enters in the responsive state. If for any reason the gap becomes closed the wave will proceed no longer and the rapid action of the auricle will cease. The three factors named, and these alone, control the length of the gap. The duration of the refractory period at any given point must always be less than the time spent by the travelling wave in completing its circuit; this circulation time depends on the length of the path and the rate of travel. Now the rate of travel from point to point in the dog's auricle beating normally is approximately 1000 mm. per second, and the length of the refractory period at normal heart rates is approximately 0·15 to 0·2 of a second. In 0·15 to 0·2 of a second the wave will travel through 150 to 200 mm. of muscle. On the basis of these values a circus movement could not establish itself in a ring of muscle of less than 150 to 200 mm. circumference. But it is known that much smaller circuits than these become established. What is the reason? The reason is that when the auricle flutters the refractory period is reduced; also, the rate of travel is usually reduced. These reductions both occur in response to an increased rate of beating such as prevails in flutter. Both changes facilitate the establishment of relatively short circus movements. The precise relations of the three controlling factors have now received close investigation. They are variable in different circumstances, but may be illustrated by a type experiment. A dog's auricle is fluttering at a rate of 500 per minute. Each circuit is completed in 0·12 of a second. The circuit has a length of 60 mm. The rate of travel is not 1000 mm. per second but 500 mm. per second. The rate of travel is but one-half the natural rate; that is so because the rate of beating is so high that the muscle is hard put to it to conduct the impulses. The length of the effective refractory period is not 0·20 but 0·10 of a second; it has become reduced with the rise of heart-rate. The cycle is divided into two parts—a refractory phase of a tenth of a second, a responsive phase of a fiftieth of a second. The crest of the wave is constantly but a fiftieth of a second behind its own wake; it travels behind it at a distance of only 10 mm. We have direct and conclusive evidence that these figures may be taken as usually representative of the gap which exists; it is a minute gap, yet upon its existence the continued progress of the wave absolutely depends. To the question of this all-important gap I shall return at a later stage; it is a gap which will command the attention of many workers in the near future, for upon our power to influence its length our success in treating flutter and, as we shall see, the closely allied condition fibrillation, will very largely depend. If by any means we could close that gap we could bring flutter to an abrupt termination.

A Hunterian Lecture

ON THE

GENERAL INDICATIONS FOR OPERATIVE EXPLORATION IN NERVE INJURIES.*

Delivered before the Royal College of Surgeons of England on Feb. 9th, 1921.

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IT has been found impossible to enunciate any hard-and-fast rules in connexion with the indications for the operative exploration of an injured nerve trunk. In actual experience the patient does not come under the observation of one surgeon from the time of the infliction of the injury to the period at which the necessity for a reconstructive operation arises. But certain broad principles are to be followed in arriving at a decision on this point. It is assumed that before any exploratory operation is undertaken the condition of the limb as regards general nutrition shall have reached the optimum stage, and that after the occurrence of sound healing of the wounds every effort has been made to loosen cicatrices in the skin and deeper parts and to obtain the mobilisation of stiffened joints. The operation performed under the conditions of massive scarring will in any case be difficult, and may even be unsuccessful in effecting repair of the nerve. The chances of prospective failure must dominate the immediate outlook of the surgeon.

We may state that an exploratory operation is either justified, or is inevitably needed, under the following conditions:—

1. Where the syndrome of complete interruption has persisted unchanged after a period of observation during which repeated clinical examinations have been carried out. In the choice of the limits of this period of delay we are influenced by the known time after the injury or suture at which the signs of recovery should be expected. The early sensory changes—viz., recession of the area of protopathic loss, or the clinical evidence of the neurotisation of muscles supplied by the proximal branches—are seen at the earliest at or about the fourth month. As a working plan a period of observation lasting six months is reasonable, although it must be admitted it is essentially an arbitrary one. Recognising that the anatomical limits of the lesion are sometimes definable in a given case before operative exploration, this full period of delay is often unnecessary, and, in fact, inadvisable, providing that the condition of the limb is such as to render any operation feasible. With regard to the stage of safety, after complete healing of the wound a period of four to six weeks should be taken as a minimum, but may be prolonged according to the influence of local conditions. In a considerable number of cases the attainment of sound healing, and the preliminary nutritive treatment, occupy the full six months' period of probation.

2. Where the syndrome of incomplete interruption has continued without change for six months and particularly when this is represented by the distal syndrome.

3. In the presence of the syndrome of irritation, either of a moderate degree showing no signs of subsidence, or in the severe type—causalgia—at the earliest possible moment.

THE PRINCIPLES OF OPERATIVE TECHNIQUE.

I. *Preparations for the Operation.*

Before the actual operative exploration of the injured limb is undertaken, in anticipation of the probable discovery of an extensive lesion which will necessitate the wide mobilisation of the nerve trunk, every precaution must be taken to obviate or minimise the inevitable difficulty of achieving repair. Chief amongst the important preliminary steps are the provision of a wide area of prepared skin—as a routine the whole of the limb—a trial of the appropriate position of the patient and limb on the operation table, and the assembly of suitable splints or other forms of fixation apparatus which have been accurately fitted to the limb in the posture which will be reproduced at the end of the operation. Upon such careful planning depends often the ultimate success of the operation, and particularly the comfort of the surgeon during its performance, for many of the operations of suture for extensive nerve injuries are, as regards difficulty and tediousness, without parallel in the whole realm of operative surgery.

During the course of the operation the position of the limb will often be changed in order to facilitate the final steps of the actual suture. The resulting position is usually one which increases the difficulties of the closing steps of the operation, and it is essential that such a change should be carried out with as little disturbance as possible. In dealing with the individual nerves these points will be further elaborated.

II. *The Exploration Technique Proper.*

(*a*) *Exposure of the nerve trunk.*—In general most peripheral nerves are exposed in a convenient intermuscular interval, and as an invariable rule the nerve trunk is to be exposed first well above and then below the area of the actual lesion. Before the lesion proper has been rendered accessible, the physical appearance of the nerve trunk is to be noted and recorded, and particularly the changes, if any, seen at the proximal and distal limits of the region of the injury.

Next the physiological activity of the nerve trunk and motor branches, if seen, and of the muscles exposed in the operation field, are to be investigated by direct stimulation with the faradic current.

(*b*) *Importance and significance of direct electrical testing.*—It should be more universally realised that in a truly efficient technique direct electrical stimulation of the nerve trunk is an essential feature. By this method information is afforded which cannot be obtained as easily or as exactly by any other form of examination. Experience has shown that the bipolar mode of stimulation is superior to the unipolar method. Using a bipolar electrode with fine points closely approximated, any tendency to diffusion is minimised and an accurate localisation of the stimulus can be obtained.

A minimum strength of current should be used as a routine so that a rough quantitative standard can be established. One of the most obvious practical advantages of direct electrical stimulation is seen in the ease with which nerve trunks are recognised in such regions as the upper arm or axilla, especially when ordinary anatomical landmarks are lost in the scarred and destroyed tissues. Further, motor branches arising from the nerve trunk above the area of the lesion are identified at once and their physiological integrity confirmed.

Information is also provided as to the quality or absence of excitability in the muscle bellies in the operation field; but the direct use of faradic stimulation is seen in the investigation of the presence or absence of conductivity in the nerve trunk itself. A response elicited from the nerve indicates the presence of a continuity of motor axis cylinders from spinal centres to peripheral end organs, except during the period immediately following the infliction of the injury. It has been shown by Perthes,[1] in experiments on divided nerves in dogs, that the distal part of the nerve loses its capacity for faradic response in about 72 hours after section, and that during the course of the subsequent regeneration the return of faradic excitability is coincident with the appearance of voluntary power; also that for a time newly regenerated fibres require a greater intensity of stimulus to produce reaction than is the case with normal adult fibres. These observations, which confirm the older physiological studies on nerve conduction, have an important bearing on the interpretation of the stimulation results obtained at operation.

It is, of course, only in dealing with incomplete anatomical lesions that the presence or absence of the electrical response is of practical value. Under such conditions various types of response may be elicited—viz., complete silence on stimulation of the nerve both above and below the lesion, a response evoked below the lesion but not above it, and, with the positive reaction above or below, a response limited to the proximal muscle groups only. In interpreting any of these results the period after the infliction of the injury must be considered.

* Being an abridgment of the second of two lectures which will appear in full in the British Journal of Surgery.

General Indications for the Choice of the Particular Type of Operative Repair.

We now approach the consideration of the type of operative repair applicable to the individual lesions which may be encountered. Returning for the moment to the classification of the pathological appearances dealt with in an earlier section it is seen that the lesions belonging to the first great group which are in actual fact, or for practical purposes, of a complete anatomical type, can be repaired by the operation of complete nerve suture only. Thus the indications in this group are simple and clearly defined. But in the second group containing a variety of lesions representing wide variations in conductivity it is necessary to consider carefully the arguments for the adoption of any particular form of repair. This involves a separate consideration of the radical procedure of resection and end-to-end suture, and the conservative manœuvres neurolysis and partial resection.

(a) Indications for resection.—Resection will be indicated where the extent and nature of the lesion is such as to prohibit a sufficient downgrowth of regenerating fibres to ensure adequate function, motor and sensory. If the operation is undertaken within the period of regeneration it is often difficult to decide in the presence of a negative faradic response in the nerve, and a clinical syndrome of complete interruption, to what extent the lesion is capable of preventing the occurrence of regeneration. The estimation of what constitutes a prohibitive degree of intraneural fibrosis is largely a matter of assumption, and therefore it is impossible to be dogmatic. But a study of cases explored at remote periods shows that certain lesions as a general rule will effectually act as a permanent block. It may be said that in the case of the nerve spindle when the intraneural induration is very dense, and particularly if the spindle is incompletely encapsuled, and connected by sprouts of nerve "callus" to the surrounding tissues, resection is justifiable. The same applies to the other forms of symmetrical lesion. When the operation is conducted at a greater period than six months from the time of the original lesion, resection of the lesion is to be regarded as indicated as a routine where the clinical syndrome is stationary and the electrical response is absent, but it must be admitted that the personal element enters into such decisions to a considerable degree.

(b) Neurolysis.—The operation of neurolysis has come to include several distinctive forms of procedure, but should properly be limited to the pure release of a nerve trunk from the scar tissue in its immediate surroundings. It is convenient, however, to consider under this heading every manœuvre which is short of the actual suture of the nerve trunk as a whole or in part. Two distinct variations can be distinguished.

(1) The endo-neurolysis operation introduced by Stoffel,[2] in which an attempt is made to remove the scar tissue between the individual nerve bundles. Such an operation, which makes a strong theoretical appeal, has proved in actual practice to be of little value. The claims made for it by its author have not been enthusiastic, nor are the reported results beyond criticism. In the few cases in which I personally have attempted to do this operation the intraneural dissection has left intact at the end perhaps one or two nerve bundles, so that the problem of the filling up of the remaining gap has at once arisen. It would be fair to say that in the case where endo-neurolysis might possibly be indicated the lesion will either be so small as to produce little interference with the nerve-conduction, and therefore is unlikely to be explored by the surgeon, or will be so extensive as to indicate without doubt the performance of total resection and suture.

A crude variant of endo-neurolysis is the operation of "hersage" of the French surgeons, in which longitudinal incisions are made into the substance of the nerve in order that the containing bundles may be released from the compression effect of the endoneural scar. This operation is obviously of a haphazard type; it has no anatomical boundaries, and is illogical in its conception. It is difficult to see how it can be done efficiently without producing harm. In the recent American literature on nerve surgery it is claimed that no permanent damage has been caused by this operation, and that its results, still to be investigated, are likely to be good. (Babcock and Spear[3].) It is fair to condemn both these procedures and to eliminate the operations of endoneurolysis and hersage from the recognised forms of legitimate nerve repair.

(2) Neurolysis proper, in the actual technique of which simple operation wide variations in detail must necessarily be seen. It has long been a recognised principle that in every operation on an injured nerve trunk the perineural scar tissue should be removed as completely as possible and the nerve restored to a bed closely approximating the normal. Neurolysis then, as a technical procedure, is the usual accompaniment of any nerve exploration in which the slightest deviation from the normal is found in the immediate surroundings of the nerve trunk.

But in connexion with the application of this procedure as the appropriate method of dealing with certain types of incomplete anatomical lesions, the potential or proved effect on the immediate and future conductivity of the nerve must be clearly defined. The rationale of the operation is based on the experience of the classical compression lesions seen in the injuries of nerve trunks in civil life and where the surgical removal of the perineural compressing agent is rapidly followed by the restoration of conductivity or function. But, as has already been emphasised, warfare lesions are primary in origin and the block to conduction intraneural in location. In the production of the loss of conductivity, the perineural fibrous tissue plays a minor or negligible part, and it is difficult to prove that the process of regeneration is delayed or even completely retarded by the continued existence of extraneural scarring. It is still more difficult to prove that after the removal of such external scar the occurrence of recovery is necessarily due to the operation per se. Such proof should be forthcoming from a study of the effects of the neurolysis operations, and would be afforded by a clear demonstration of the rapid return of function, or the appearance of steady recovery after a prolonged stationary syndrome of blocking. The downward march of steady recovery seen over a period corresponding to the time taken by normal or even abnormally slow regeneration, or the ultimate recovery seen in a nerve operation long after the operation, and where no clinical observations on the rate and type of regeneration have been made in the intervening period, is not in any way indicative of the beneficial effects of the operation. From my own observations in a considerable number of the operations classed as neurolysis, such distinctive proofs are not forthcoming. The exact manner in which removal of perineural scar tissue might influence the conditions in the interior of the nerve trunk is also not easy to explain. That a new vascularisation of the immediate surroundings will be promoted is obvious. But, as we have seen, the extraneural vascular supply has little significance in relation to the process of regeneration. Souttar[4] has suggested that the effect of neurolysis is to restore the mobility of the nerve trunk in the area of the injury, and thereby eradicate a factor which is indirectly productive of a continuance of intraneural trauma from the repeated slight stretching of the nerve during the movements of the limb.

It is important to recognise that in the warfare nerve operation the operation of neurolysis has a distinctly limited application if it is to be judged as an entity and regarded as a method of repair competing on almost equal terms with resection and suture. When a lesion of the incomplete type is exposed at operation the decision to be made is whether resection is justifiable, and if this is decided against—that is to say, it is considered that the nerve trunk will show ultimate spontaneous regeneration—the nerve is placed in the best possible surroundings with the expectation that in some way the improved nutritive standard of the bed will help to promote the development of such spontaneous intraneural repair.

Summary.—We may conveniently summarise the position of the neurolysis operation as follows:—

(1) The technical details included in the full scope of the operation are an essential feature of every nerve exploration in an endeavour to provide a normal bed and the local free mobility of the nerve trunk.

(2) The influence of the operation itself in the restoration of future conductivity is difficult to estimate. Owing to the special characteristics of the lesions typical of warfare injuries any operation which is limited to repair of the extraneural lesions is a priori likely to play a subordinate part.

(3) The operation is not an equivalent alternative to resection and suture in any given incomplete type of lesion.

Partial resection and suture.—Reference has already been made to the suggestion that in theory the recognition of a lesion confined to a limited area of a nerve trunk, with an absence of conductivity demonstrated by direct faradic excitation at operation and with the clinical syndrome presenting a paralysis limited to the muscle group which fails to respond, would have afforded opportunities for the trial of the conservative operation of partial resection. From a technical point of view, if this operation is feasible the resulting gap must either be closed by direct suture with inevitable looping of the intact portion or by the insertion of a nerve graft, both procedures which do not fulfil the ideals of repair. The method of partial resection and partial grafting has been advocated by the French school, but the literature offers no detailed reports which can be submitted to a critical examination. Doubling or looping the intact part of the nerve trunk is in no way inherently harmful, and later on

disappears, as may be seen at re-explorations after suture of one component of the sciatic trunk. But apart from technical objections, it is certain that the indications for partial resection cannot be clearly defined except in theory, and conditions under which the operation would be feasible are so rarely reproduced in practice that the operation may be eliminated as a standard method of nerve repair.

Difficulties in obtaining End-to-End Suture.

It is necessary to return to a review of the difficulties which are so often encountered in the attainment of the end-to-end apposition which precedes the actual suture.

1. *Mobilisation and relaxation of the nerve.*—Of the methods employed to surmount these difficulties, some have established themselves as legitimate steps in the operation technique about which there can no longer be any question of conflicting opinions. These are the widest mobilisation of the nerve afforded by the most extensive anatomical exposure, the stripping or even the sacrifice of muscular branches, such displacement of the nerve as will shorten its course, and the relaxation obtained by the appropriate changes in the posture of the limb. Such measures will enable almost every gap to be closed and the number of true irreparable lesions will then be small.

2. *The two-stage operation.*—If end-to-end apposition fails at the first exploration it is legitimate to re-explore after an interval. The two-stage operation, in which the untrimmed ends are anchored by sutures, and rapid stretching is carried out over a short period, is sound in theory, and certainly in practice seems to facilitate the achievement of suture, but in my opinion not for the reasons generally attributed to it. There is really little, if any, true stretching of the nerve trunk during the intervening period, and the actual gap does not diminish. In my own two-stage operations I have been struck by the fact that the anchored stumps have rapidly become fixed to the surrounding tissues at a time before the condition of the patient and limb has allowed stretching to begin. In a certain number of cases re-exploration has to be postponed for a period beyond that during which the hypothetical stretching is completed.

In the sciatic nerve, for which the two-stage operation is especially useful, the long tedious primary operation which is often provocative of a considerable degree of shock, and is followed by considerable post-operative pain and discomfort, can rarely be repeated within a few weeks.

I would suggest that the success obtained in the two-stage operations is due to the fact that instinctively a wider exposure of the nerve is made, and this with the sheer determination to effect repair, plays a dominating part. I am confident that this is the correct explanation in the successful two-stage sutures in my own operations. In fact, the period between the two explorations can be prolonged with advantage, as the intensive physio-therapeutic measures applied during the interval undoubtedly can produce a greater degree of softening and extensibility in the tissues of the limb.

3. *Bone shortening.*—There remains to be considered one other procedure which has been freely advocated—viz., the operation of bone shortening. It should be said at once that to this method there are serious objections. It belongs essentially to the type of operation which depends for its popularity on pictorial representations which appeal to surgeons who are inexperienced or ill-trained in the technique of reconstructive surgery. In the limb in which an extensive gap in an injured nerve trunk is found the coexisting injuries of the soft parts and often of the bony skeleton are sufficiently grave to render the operation mechanically difficult and provocative of a recrudescence of sepsis. In the lower limb the operation is to be condemned under any circumstances. In the upper limb it is justifiable for one indication only, and that is where an ununited fracture of the humerus accompanies a musculo-spiral nerve injury, and where bone shortening, the performance of the recognised stepcut operation, is a necessary preliminary to exploration and suture of the nerve.

4. *Bridge operations.*—In the few operations where, in spite of the measures indicated above, end-to-end apposition is still unattainable the lesion must be written off as irreparable by the method of direct suture. At this stage the divergent views of two schools are to be examined. On the one hand, the idea of nerve repair is abandoned permanently and recourse is had to those alternative methods for the restoration of function, which involve plastic operations on muscles, tendons, or joints. On the other, the gap in the nerve trunk is to be filled by the insertion of some form of bridge across which it is hoped or claimed that regenerating fibres will travel. Perhaps no one section in the surgery of nerve injuries has excited so much interest and discussion as the question of the utility of the various forms of bridge operations. Such are neuroplasty (repair by flaps), nerve grafts, and tubulisation, and though not in the strict sense a bridge operation, the various forms of nerve crossing.

(*a*) *Flap operations.*—This operation, illogical on physiological grounds and proved to be totally incapable of facilitating regeneration in experiments, has received its final deathblow in a recent review by Stookey[5] of the published results in the whole of the literature of nerve surgery.

(*b*) *Nerve grafts.*—The nerve graft has long held an honoured place in the surgery of peripheral nerves and during recent years has been extensively employed. It has been an acknowledged fact that axis cylinders can cross a gap and may utilise existing channels afforded by the graft. This is shown quite definitely in the modern histological work of Lewis,[6] Nageotte,[7] and Ingebritgsen.[8] But as a method of practical repair the operation will be judged by its capacity for the conveyance of such a large number of axis cylinders as will invade the distal trunk and ultimately function. From this viewpoint a clear distinction must be drawn between the various types of graft operation. Those practised are the single small trunk graft, multiple or cable grafts, and the single large trunk graft. The autogenous or homogeneous nature of the transplants does not appear to influence the fundamental question of their utility. Other things being equal, the large trunk graft or cable grafts which provide opportunities for the crossing of the total number of axis cylinders of the injured nerve should be superior to the single cutaneous graft of small calibre. This latter technique has, perhaps, been the common routine in nerve surgery and particularly in this country, whereas in America and France the use of cable grafts and large homogeneous trunk grafts has been the rule. In reviewing the recorded results of these operations in an attempt to estimate their functional value, if any, it is important to recognise these quantitative differences in the technique. In the warfare literature, successes have been reported in nerve grafts particularly by the French School of Surgeons (Sencert). In this country Joyce,[9] Forrester Brown,[10] and others have recorded cases in which restoration of conductivity has been exhibited, and in the addendum of the report of the Medical Research Council details are included of two cases in which success was confirmed by members of the committee. Dean Lewis (loc. cit.), whose contributions to nerve surgery have been amongst the most authoritative in the American literature, has seen slight return of motor power in 2 out of 12 cable graft operations.

A year ago I reported[11] the complete failure of 18 bridge operations performed in my series which had been studied over varying periods extending up to two years, and of which 11 were examples of nerve grafting in which a single cutaneous graft had been used. From the additional evidence derived from the re-exploration of four and the histological examination of one resected graft it was urged that the operations from a practical standpoint were to be considered as failures, and the re-exploration of all bridge operations was advocated where at a second attempt end-to-end suture would be feasible. Since then a further number of these bridge operations have been re-explored, making six in all, and in addition one has had an opportunity of resecting two grafts inserted by other surgeons. My colleague J. S. B. Stopford[12] has examined seven additional cases, all of which have shown failure of recovery. From the appearances revealed in my secondary explorations of five grafts the hypertrophy of the grafts described by various observers (Joyce, Lewis, and Forrester Brown) was not confirmed.

This experience caused me to range myself alongside those who have unhesitatingly condemned the use of nerve grafts. But the recent secondary exploration of one of my cases three and a half years after the insertion of a graft for an ulnar nerve injury in the forearm has provided me with an interesting and instructive experience. When the nerve trunk was fully exposed a definite response was elicited in the hypothenar muscles and adductor pollicis from stimulation of the nerve above, below, and in the area of the graft. This particular graft had retained its original calibre, and at each extremity there was a slight enlargement of the nerve trunk, but without any obvious induration. The original fascial sheath was recognised closely enveloping the area of the bridge. In view of the electrical findings it was decided to leave this nerve in situ, and a careful examination of the patient since the operation shows that it is possible to recognise the existence of a very slight recession of the area of protopathic loss in association with a positive Tinel's sign. The ulnar intrinsic muscles are still completely wasted as before, and the external electrical tests gave the typical sluggish galvanic response only.

It is not to be questioned that conduction can be established through nerve grafts, but it should be realised that even for incomplete success the operation must provide a passage for a considerable number of motor and sensory fibres. In anything less than restoration of the full calibre of the nerve trunk the chances of a useful regeneration are small. It is therefore in the future to the reports of the results of the operations of cable grafts or homogeneous large grafts that we may look for confirmation of their value. Until such reports are forthcoming condemnation of

these procedures, not on physiological grounds, but as practical manœuvres is still reasonable.

It is further essential to discourage the half-hearted attempts at obtaining suture in difficult cases which are likely to be characteristic in the future of the technique of the inexperienced surgeon who is comforted by misleading and enthusiastic reports of the value of the operation of nerve grafting.

(c) *Tubulisation.*—The operation of tubulisation demands brief reference only. Successful in animal experiments, it has proved a complete failure in nerve surgery, and this has been commented on in the literature from all countries (Dean Lewis, Platt, Stracker, Wollenberg[13]).

(d) *Nerve crossing.*—The probable failure of the operation of incomplete nerve crossing (nerve anastomosis) has already been foreshadowed in the earlier part of this paper. Of the examples of incomplete distal anastomosis performed elsewhere which have passed under my notice, in all the distal end of the ulnar nerve had been implanted into the median. These patients have been carefully examined on repeated occasions by Stopford, who has demonstrated in all not only complete failure of regeneration, but the interference in the conduction in the median nerve which had directly followed the operation. In four of these the ulnar nerve has been re-explored, divided at its junction with the median trunk, and end-to-end suture obtained.

In my opinion this operation should be condemned in no measured terms.

GENERAL CONCLUSIONS ON THE POSITION OF BRIDGE OPERATIONS.

It is reasonable to emphasise that the recorded success of a small number of operations of the bridge class should not be allowed to influence the surgeon in the direction of relaxing his efforts to obtain end-to-end suture, no matter how exhausting and tedious any operation may be. The two-stage operation should be considered as an established method, and if failure is again experienced at the second attempt the gap may be legitimately closed by the insertion of a full-size graft or cable graft; but at the best little or no recovery can be expected. Under such circumstances, after a prolonged period, and if an alternative operation of equivalent functional value is available, as in the case of the musculo-spiral nerve injuries, this should be performed without further delay.

RESULTS OF OPERATIONS FOR THE REPAIR OF NERVE INJURIES.

Analysis of a Personal Series of Operations.

General survey.—In Table I. is shown an analysis of the total operations performed in my services over a period extending from March, 1915, to December, 1920. They may be taken as representative of an average individual operative experience, and it is therefore safe to refer briefly to certain general information that the statistics themselves afford. In the first place it is seen that the ulnar nerve has dominated the whole surgical field. Further, the infrequency of the operations on the brachial plexus and the complete absence of any operation on either the musculo-cutaneous and circumflex nerves in the upper arm, or the anterior crural nerve in the lower limb, are facts to be noted but requiring no special comment. In the various types of operation the phases through which the operator passed are illustrated in the large number of operations of the bridge type and those in which repair was abandoned.

Analysis of Results.

Of the operations in this series it has been possible to investigate the early and later results over periods extending from six months onwards in 247 only.

It must be admitted at the outset that this study includes few if any *true* end-results. The most reliable records in our possession are those accumulated on the operations performed since 1917, when the advantages of a more efficient segregation of the patients, and the inauguration of the follow-up system were available. But even under conditions which from the point of view of civil surgery might be considered ideal, the greater number of the patients could be kept in hospital for short periods only, and ultimately were distributed in various parts of the country. This difficulty has been experienced by all surgeons working in this field, and it explains the comparative paucity of the operation statistics produced in this country up to the present date. But the same deficiency is seen in the literature of the European countries. From America, however, where practically every nerve injury was sustained in 1918 and the prompt segregation of all patients was effected from the beginning, and where the operations were carried out under conditions of less physical strain, valuable contributions should be forthcoming in the near future.

In this post-operative study the presence or absence of signs of recovery have been recorded after personal examinations only. Whilst many patients living at a distance have from time to time replied to inquiries as to their progress, the inclusion in their reply of suggestions indicating recovery or otherwise have always been ignored. It is perhaps unnecessary to stress the fallacies of conclusions drawn from such impersonal investigations; my excuse is that one has occasionally seen in the possession of out-patients forms which were to be filled up recording the impressions of the man himself on the alterations in the sensory and general functional condition of his limb.

The 248 operations from which information as to results have been available include the following: end-to-end suture, 150; neurolysis, 80; bridge operations, 18. The results of the bridging operations have already been alluded to in the general exposition of the technique of operative repair, and therefore demand no further consideration.

Results of End-to-end Suture—150 Operations.

My colleague, Stopford,[14] issued a year ago a preliminary report based on a study of 271 suture operations, and in his series included the bulk of my own operations up to date, in addition to the observations made on a considerable number of our out-patients who had been operated on in other surgical centres. The experiences of a further period of

TABLE I.—*Total Operations.*

—	Suture.	Neurolysis.	Bridge.	Repair abandoned.	Partial suture.	Exploration. No lesion.	Exploration. Nerve left in situ.	Injection.	Exploration first stage.	Total
Brachial plexus	5	4	—	—	—	2	—	—	—	11
Musculo-spiral	51	15	5	14	—	1	—	—	1	87
Median	70	45	6	—	5	2	3	1	—	132
Ulnar	115	49	12	—	—	1	5	—	—	182
Posterior interosseous	1	—	1	—	—	—	—	—	—	2
Sciatic	51	9	3	—	2	1	—	—	4	70
External popliteal	14	2	—	6	—	—	—	—	—	22
Internal popliteal	—	2	—	—	—	—	—	—	—	2
Posterior tibial	—	1	1	—	—	—	—	—	—	2
—	307	127	28	20	7	7	8	1	5	510

Operations for severe causalgia, 25: median, 14; sciatic, 10; internal popliteal, 1. Operations in which end-to-end suture failed, 53. Successful suture at second attempt, 1. Failure of suture at second attempt, 3.

TABLE II.—*End-to-End Sutures.*

—	Total cases.	Number of recoveries.	Analysis of recoveries. Motor. Proximal muscles only.	Motor. Proximal and distal. Incomplete.	Motor. Proximal and distal. Total.	Motor. Distal alone.	Sensory. Associated.	Sensory. Alone.	Total failures.
Musculo-spiral	35	26	10	11	5	—	All.	—	9
Median upper arm	10	10	7	3	—	—	In 5.	—	Nil
Forearm	20	17	3	—	—	6	In 6.	8	3
Ulnar upper arm	27	24	19	3	—	1	In 14.	1	3
Forearm	20	17	—	—	—	10		7	3
Sciatic—trunk	21	16	16	Nil.	Nil.	—	In all	—	5
Segmental	4	2	2						2
External popliteal	9	4	4	Nil.	—	—	In all	—	5
Posterior interosseous	1	Nil.	—	—	—	—	—	—	1
Plexus	3	2	2	—	—	—	2	—	1

Recovery, 118 (79%); failure, 32 (21%).

12 months have allowed one to collect additional evidence concerning the fate of a considerable number of the patients with whom we have been in touch. It is a simple matter to accumulate a mass of details in the case of each patient under observation which are interesting to the individual neurologist or surgeon, but it is not an easy task to concentrate them into skeleton form. At the same time, however desirable broad conclusions accompanied by figures representing percentages of this or that type of recovery may be, the lessons of failure, which, as in all surgery, form the real foundation of teaching, can be acquired only from a consideration of each individual case in full detail. Such can hardly be presented in the limits of this lecture.

In the accompanying tables are shown the figures illustrating the frequency and type of recovery in nerve suture. The recovery of motor function is divided up under the headings of the proximal and distal muscle groups, a classification which is found to be convenient, particularly for the upper limb. In the whole series there are no examples of absolutely complete and perfect recovery excepting possibly in five of the musculo-spiral and two of the external popliteal sutures. The operations in which the existence of recovery is charted include every variety and type of incomplete restoration of conduction in the sutured nerve. It is not considered a logical procedure to classify such recoveries into further arbitrary special divisions, such as "slight," "marked," and so on, for the simple reason that the periods of post-operative observation are not constant for any one group of allied operations. This is strikingly illustrated by the figures for the musculo-spiral nerve, where in the first column, the majority of the patients were examined at an interval less than one year (with two exceptions), in the second column under 18 months (two over 2 years), and in the third all over 18 months. To a lesser extent this applied to all other nerves, and it indicates, that given long periods of time, many of the imperfect recoveries of to-day will progress, or have already progressed, towards the stage of complete recovery. The standard of failure adopted in my analysis is the existence of complete and stationary absence of recovery after a year or more, and in some cases confirmed by the evidence of re-exploration. With regard to the sensory recovery noted, as a whole, in very few cases has there been more than a slight recession or incomplete restoration of protopathic sensibility.

The information and conclusions as to the late results of suture may best be embodied in a consideration of the main factors which have determined, delayed, or entirely prevented success.

1. *Period of delay between original injury and performance of the operation.*—In my own series the influence of the time factor has been definitely proved. As a general rule sutures performed within a period of 18 months show little appreciable differences in the time of the onset of recovery or the rate and ultimate completeness of the recovery. After a delay of two years recovery is often seen to be tardy, incomplete, or in some cases fails completely. This truth has long been established as a fundamental factor in prognosis in the older nerve surgery (Kennedy [15]). My records show what has been pointed out in Stracker's careful analysis of the operations performed in the clinic of Hans Spitzy, of Vienna, that the degrees of delay within the safe period does not influence the percentage of cases showing recovery, but does seem to prejudice the ultimate quality and type of the regeneration. In the complete failures, quite apart from other influences, the time factor plays an important part. It is assumed that this is dependent on the development of permanent retrogressive changes in the spinal cells and to a much lesser degree to peripheral degenerative changes in the muscles. On the other hand, in the analysis of the operation results in the service of Sir Harold Stiles, of Edinburgh, it would appear that this factor has exerted a negligible influence (Forrester Brown).

2. *Recrudescence of septic infection in the limb.*—The recrudescence of infection at a period after the suture has been seen in a number of the cases in my series. Where this has arisen spontaneously it does not appear always to have affected the regenerative process, but it has been my fate to see a definite recession in the regeneration which had already begun, after the exploration of an associated ununited fracture, followed by infection. This unfortunate sequela, due to imperfect surgical judgment, is one which could have been avoided, and, perhaps, is hardly to be cited as a fair test of the resistance or lack of resistance to sepsis of the regenerating nerve. In the recovery stage of a number of sciatic nerve sutures the trophic ulceration seen under the base of the fifth metatarsal or in the terminal phalanx of the great toe where definite necrosis has resulted provides a continued source of infection which might conceivably be absorbed and travel upwards towards the area of suture. Delay or cessation in recovery has been invariably associated with this complication, and I would suggest that it is in some way connected with the absorption by the regenerating nerve of distal sepsis.

3. *Anatomical situation of suture.*—The distance of the line of suture from the spinal centres, or conversely from the distal extremity of the limb, is seen to be an important factor in determining the fate of the regenerative process. This is illustrated by a study of the time of onset of the appearance of recovery in the muscles supplied at successive levels, and in a comparison between the results of suture in the proximal and distal parts of the limb respectively.

The times of the appearances of recovery in the chief muscle groups have been carefully charted in Stopford's recent contribution, and are seen also in Stracker's monograph. Recovery in the proximal muscles begins at an early or later date according to the proximity of the suture to the spinal cord, and occurs in regular descending fashion in accordance with the anatomical origin and distribution of the motor branches. Thus, for example, after suture of the musculo-spiral nerve in the upper, middle, and lower third of the arm, return of power is manifest in the supinator longus at about the seventh, sixth, and fourth months respectively. Distal recovery also shows these differences in time relation.

In Stracker's figures [16] no recovery was seen before one year after suture in the distal muscles of the musculo-spiral, median, or ulnar supply, and this irrespective of the level of the suture. On the whole this is borne out by the records of my own operations. Thus the time taken in neurotisation of the distal muscles is not entirely dependent on the distance which downgrowing axons have to travel. It has been concluded from this that the results of suture are better in the proximal part of the limb than in the distal. Stracker states that in general sutures below the origin of the proximal muscle branches give bad results. This would appear to be correct as a broad statement, but on careful examination requires certain qualifications. If the results of suture of the median and ulnar nerves in the upper arm and forearm are compared as regards distal recovery alone, both motor and sensory function combined, which means that a period of 12 months at least must have elapsed, the quantitative recovery appears to be roughly equal in each group.

4. *Influence of topography.*—The inaccuracies of regeneration due to the shunting of motor fibres along sensory channels and vice versa are undoubtedly one of the causes of imperfection in the recoveries and may be of such a degree as to determine complete failure. It has been impossible in a close perusal of one's operation records to correlate in each case the potential influence of this factor with the type of recovery seen. In the sciatic nerve sutures it has been easy to retain an accurate topography, whilst in the musculo-spiral the comparatively scanty sensory bundles, even when misdirected, have not prevented the transmission of a large proportion of motor fibrils along appropriate channels. The exact rôle of topographical errors as applied to the individual operations cannot be settled until it is possible to examine a large number of successful sutures of the median and ulnar nerves after a period of three years or more.

In certain situations—e.g., in the lower half of the forearm where suture of either the ulnar or median nerves has been achieved with what might be claimed as faultless topography, one has had little direct proof of its beneficial effect. Topographical failure is best illustrated by the suture of a nerve of smaller calibre to a larger trunk, as in the case of suture of the posterior interosseus to the musculo-spiral and of the anterior tibial and musculo-cutaneous to the external popliteal, operations which account for eight cases traceable in my series and in all of which complete failure resulted. The topographical factor in regeneration is, however, usually cited as an illustration of the apparent superiority of the results of suture of the musculo-spiral nerve over those of the median and ulnar nerves and of the delay or absence of recovery in the distal muscles.

5. *Influence of perineural surroundings.*—The nerve bed. It does not appear from my own observations that the perineural surroundings have influenced the occurrence of recovery after nerve suture in any way except in a few cases where the nerve trunk has been subjected to the friction of a bony groove, as in the case of the ulnar at the elbow, or has been left in close relation to bare tendons—e.g., median suture at the wrist. The deleterious effects of a nerve bed of this type have contributed to the complete failures of one ulnar and one median suture, but failures of this type are to be regarded as preventable with a more efficient technique.

6. *Influence of complications.*—(*a*) Vascular. In a number of upper arm sutures of the median or ulnar nerves, or both, where ligature of the brachial artery has been performed in the early days of the injury, there has been little appreciable effect on the rate and degree of recovery. Where contractures and other signs of ischæmia have coexisted and the total mechanical disability is naturally great, the

clinical evidence of the recovery of the nerve has often been masked.

(b) Non-union of fractures. The continued existence of non-union of a fracture without active inflammatory signs in the neighbourhood of the recovering nerve has retarded or prevented recovery in two musculo-spiral sutures in my series; one showed a failure of distal regeneration after four years; and the other, a total absence of any sign of recovery. The cause of these failures is to be attributed to the effect of tension and friction.

7. *Continuance of active interstitial neuritis in the proximal nerve.*—This is a potent cause of delay or failure which theoretically is avoidable by a free resection preparatory to suture. But it is certain that histological evidence of interstitial change may often be present in the proximal part of the nerve trunk when there is little or no macroscopical sign of its existence. Where there has been a long delay owing to the presence of inveterate sepsis in the limb the interstitial neuritis finds its maximum development. In my own operations complete failure or imperfections in recovery have been dependent on this factor, and particularly in the sciatic nerve, where the ill-effects are manifested during the stage of tardy recovery by the development of the signs of irritation. In three cases, after a period of more than two years, the pain in the internal popliteal distribution is a most serious handicap to the patient, and continues to defy every form of treatment. On the other hand, in one of the complete recoveries after musculo-spiral suture, definite evidence of interstitial neuritis was seen in the proximal part of the nerve trunk at the time of operation, and owing to the size of the gap the suture was performed at a level which was considered far from ideal.

It now remains to judge the results of these nerve sutures from a qualitative standpoint. In this estimation it is necessary first of all to eliminate from the total disability of the limb the contribution of the coexisting injuries of other tissues. But function dependent on a restoration of nerve conductivity alone is itself essentially complex. Success depends not merely on the simple restoration of adequate motor and sensory conduction, but on the development of coördination in the particular movements, in which the efferent and afferent supply of the sutured nerves are concerned. In the musculo-spiral sutures, where full conductivity has been restored, and where recovering muscle groups have achieved considerable power, there has been as yet no perfect individual extension of the fingers, no synergic function in the extensor muscles of the wrist, and there is on the whole an imperfect control over the extensor muscles of the thumb.

In the median nerve poor function has been the rule, chiefly owing to the very limited sensory recovery. The helpless anæsthetic index finger which is characteristic of most of these cases long after the operation is a striking illustration of the importance in function of a restoration of the median sensory mechanism. In the ulnar nerve, where there is often a mobile hand without contractures, the gross function is little diminished even in the presence of a complete syndrome of interruption, and full restoration is of little moment except for the skilled worker. To many of these hands the addition of conductivity in the ulnar nerve has made little or no difference in function. The full sciatic syndrome in itself does not cause gross loss of function in the lower limb as regards the act of walking. It is difficult to estimate the increased value of the motor recovery, which at the best has been moderate power in the calf and a less complete and powerful action in certain muscles of the extensor group.

Results of the Operation of Neurolysis.

Whilst it is possible to study the results of end-to-end sutures in a truly mathematical fashion, a scrutiny of the results of the operation of neurolysis is beset with many difficulties. It will be sufficient to reiterate and amplify from a consideration of the results in 80 cases what is regarded, in my opinion, as the legitimate scope of this operation.

In the results are seen both recoveries, partial and complete, and complete failures. There have been no rapid recoveries within the period of nerve regeneration, for the type of lesion in which this might have occurred has not been explored. Where recovery has been seen it has been on the conventional lines of the ordinary regeneration as regards time and general progress. A certain number of operations have been premature explorations for lesions of a low grade, in which spontaneous regeneration was at the time proceeding. Where failure of recovery has occurred the intraneural changes have been of such a nature and extent as to inhibit the downgrowth of regenerating axons, and the extraneural operation has failed to alter the intraneural conditions. Whilst improvement has occurred in the neurological syndrome after the operation of neurolysis, in 75 per cent. of cases it has been impossible to prove that the operation itself alone has determined this.

For these reasons I would urge that the limitations of the operation of neurolysis as a definite factor in the surgical treatment of the warfare lesions of nerves are to be fully realised.

Results of operation for causalgia.—My series includes 25 operations performed for severe causalgic manifestations, 14 on the median nerve, 10 on the sciatic nerve, and 1 on the internal popliteal nerve.

General Conclusions on the Late Results of Nerve Operations.

References have been made from time to time to the results quoted in other contributions in the literature of the peripheral nerve surgery of the war. From this literature, already vast, it has been impossible to collect and compare on any recognised standard the total statistics as to the late or end-results of the various forms of operations. From a wide study of this literature, and a personal intensive study of one's own material, it is possible merely to enunciate broad generalisations, influenced in particular by the consideration of the causes of failure and success.

During the past year it has become increasingly difficult in this country, at any rate, to keep in touch with the patients who have been operated upon, even during the last two years. The chances of an acquisition of further comprehensive knowledge regarding true end-results would therefore seem to be slender. This is a bitter disappointment after the labours of a number of years. But, for some little time, a small stream of patients with nerve injuries still unoperated on, or showing failure after previous operation, will continue to flow into the surgical centres of the Pensions Ministry. Such patients, on the whole, are now undesirous of submitting to operative procedures. But the surgical lessons gained from the amount of experience behind us are yet to be applied for the benefit of a few. And it is of great economic importance that clear indications as to the advisability at this date of the exploration or re-exploration of the injured nerves should be laid down. Every lesion will date back at least two years, so that the optimum period for the surgical repair of the nerve is now past. But for perhaps a year longer it will be worth while advising operation in selected cases. Before doing so the economic value of the restoration of nerve conduction to the future capacity of the limb must be gauged. In many limbs an operation is now a waste of time. From a serious consideration of this problem, which is entering into one's surgical work at the present time, it is suggested that the exploration or re-exploration should be considered under the following conditions:—

1. In complete lesions of the median or ulnar nerves in the upper arm. The restoration of function in the proximal muscles is to be expected, even after long periods of delay, but distal recovery may probably not take place. For lesions of those nerves in which conduction is already present as far as the proximal branches with the total failure of distal regeneration, exploration is on the whole advisable, but short of resection and suture, which may be unjustifiable, nothing can be done.

2. In complete lesions of the median and ulnar nerves in the forearm. The potential restoration of sensation in the median is of such great importance as to warrant every effort to be made to ensure its occurrence. In lesions of the median in which partial sensory conduction is present, but with complete motor loss, resection and suture at this date should be strongly condemned. For the ulnar, where the intrinsic muscles are alone inactive, resection is always worth while.

3. In all complete sciatic lesions where end-to-end suture can be reasonably expected.

4. In musculo-spiral lesions exploration of the nerve should precede the performance of tendon transplantation.

Alternative Operations.

Although a technical consideration of those alternative operations for the restoration of function when nerve repair has been deliberately abandoned, or has failed to ensure conduction or function, is outside the scope of the present study, the question of the appropriate time and indications for their exhibition is one which is intimately concerned with the observations of the failures and successes of the suture operations.

Where the nerve lesion is declared to be irreparable after an exploratory operation the indication for the performance of an alternative operation is clear. But in the case of imperfect function following the incomplete restoration of conduction the rôle of the alternative operation cannot be so readily defined. Many of the operations performed under the latter heading have been premature and have been done early in the reconstructive surgery of the war when the normal prolonged stage of recovery of the injured or repaired nerve was not fully realised. The capacity for regeneration and ultimate function of the nerve after repair is apt to be minimised. Every surgeon who has lived close to this problem must have felt at times despondent. The immediate failures or late failures are easily explained and many of their causes in the future can be avoided. It is likely from what we have seen of the behaviour of the regenerating nerve, that after long periods of time, in a considerable number of instances, there will be well-marked recovery of function. It is to be admitted, on the other hand, that to wait for a future recovery of uncertain value is likely to be unsound. Again, the alternative operation itself may in no way jeopardise the recovery of the nerve, and therefore little harm can be done by its early performance. Few of the alternative operations have entered permanently into one's surgical repertoire. In the upper limb these are, above all, the now classical operation of tendon transplantation for irreparable musculo-spiral injuries, the results of which are extremely gratifying; the simple tendon transplantations for restoration of flexion of the fingers or thumb in median and ulnar injuries; and in the lower limb the destructive operation of tenodesis of the ankle as an alternative to the lifelong wearing of apparatus. A new procedure has recently been added to the alternative operations which belongs to peripheral nerve surgery itself. This is the implantation of the proximal end of the radial nerve into the median nerve at the wrist—an attempt to restore that lost sensory function in the median area which produces such a grave incapacity. This operation was introduced by Harris,[17] of Toronto, and is supported by the report of one successful case. For the few irreparable lesion of the median nerve in the forearm this operation may be worth a trial.

I am indebted to a number of colleagues for their invaluable coöperation in the work upon which these lectures have been founded—to Professor Stopford above all, to Mr. E. S. Brentnall, and to Dr. E. H. Linell. Finally, I owe to Sir William Thorburn, my former chief, my early training and interest in peripheral nerve surgery, and to Sir Robert Jones the opportunities afforded for this work in the surgical direction of a special hospital.

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RESEARCHES ON THE BIOCHEMISTRY OF GERMS AND OTHER PROTEINS.

WITH SPECIAL REFERENCE TO THE PROBLEMS OF IMMUNITY.

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PART I.—THE SPLITTING OF GERMS AND OTHER PROTEINS INTO THEIR COMPONENT PARTS.

1. *Preliminary Note.*

THE history of man's research on the human body and its diseases has shown a definite series of stages, wherein he has passed from the gross to the minute and from the minute to the microscopic. We are now advancing rapidly to the study of the ultra-microscopic, a study which is all-important to our further progress. Anatomy led to pathology, pathology led to histology and to bacteriology, and bacteriology in its turn has directed us to biochemistry. The dominant importance of these previous stages may not be gone for ever; when those who come after us have analysed more finely still these mysteries of nature, man will no doubt turn again to study the process by which from the infinitely fine the grosser substance is built up.

2. *Introduction.*

The biochemical researches which I am about to describe were commenced in the early part of 1917. At that time I was engaged largely in growing the gonococcus and in making large quantities of gonococcal vaccine for the army.

The gonococcus is a germ which undergoes autolysis or disintegration very readily. On certain culture media the cocci swell up and fuse to form a viscid material, in which no discrete organisms can be distinguished. After many experiments carried out to ascertain the cause of this phenomenon I eventually discovered that gonococci are very readily soluble in dilute alkalis, such as normal or even decinormal sodium hydroxide; suspended in an alkaline urine they disappear or melt away in a few hours, but in an acid urine they remain distinct and discrete for many months. Thus when emulsified in Na_2PO_4 solution, which is strongly alkaline, the germs rapidly dissolve; in Na_2HPO_4 solution (slightly alkaline) they autolyse more slowly, while in NaH_2PO_4 solution (definitely acid) they remain discrete and unchanged. These facts impressed me very strongly, and I eventually found that if a considerable mass of gonococci is treated with an equal volume of N/1 NaOH, the mass completely dissolves in a few hours, to form a yellowish syrupy fluid. Solution is brought about more rapidly with gentle heating. By adding an acid such as N/1 HCl to this alkaline solution, it is possible to bring it to a state of neutrality without any apparent change. I made use of this neutral gonococcus solution as an antigen in the complement-fixation test for gonorrhœa, and it worked very well (D. Thomson,[11] 1918, confirmed by W. Magner[9]). These researches showed that the germ can be dissolved in alkali without thereby altering its antigenic properties. When an alkaline or neutral solution of the gonococcus is boiled for five minutes it does not coagulate, and it still remains a tolerably good antigen. When boiled for 30 minutes or longer, however, its antigenic properties are largely destroyed.

When an alkaline solution of gonococci is neutralised with N/1 HCl and then rendered definitely acid to litmus, a heavy white precipitate is thrown down. At first I believed that the gonococcus was largely composed of a fatty substance which was saponified and dissolved by the alkali, and that the precipitate thrown down by acid consisted of a fatty acid, but it was subsequently proved that the precipitate was a protein substance.

3. *First Attempts at Producing Detoxicated Vaccines.*

Having ascertained that the gonococcus substance (thrown out of solution by acidification) is antigenic, I commenced to test the therapeutic value of this precipitate by subcutaneous injections in gonorrhœal subjects. It was found, after many injections, that the precipitate was some 50 times less toxic than the actual untreated gonococci themselves. Moreover, the larger doses of the non-toxic precipitate appeared to confer more immunity and gave better therapeutic results than the necessarily smaller doses of the untreated germs.

In order to test scientifically the relative value of the non-toxic precipitate and the ordinary toxic vaccine in the production of immunity I made use of the complement-fixation test. A large number of such tests were carried out in four parallel series of patients, and clinical observations were carried out simultaneously by the same clinician (Lees,[15] 1919).

Series A, in which the gonorrhœal subjects received no vaccines, showed on the average three units of immunity acquired naturally in the course of the disease.

Series B received ordinary gonococcal vaccine in doses of 5 to 100 million germs, and developed about four units of immunity.

Series C received ordinary gonococcal vaccine in doses of 25 to 200 million germs, and developed an average of five units of immunity.

Series D received the non-toxic precipitate in doses corresponding to 2500 to 10,000 million gonococci, and developed as a rule 8 to 12 units of immunity.

Further injections of the comparatively large doses of the non-toxic gonococcus precipitate into normal subjects rendered their blood positive to the disease, whereas the necessarily small doses of the toxic untreated germs had no such effect. (Thomson,[1] 1919, and D. Lees,[4] 1919.) These immunisation experiments have been more or less repeated and confirmed by H. B. F. Dixon and A. H. Priestley[3] and by W. V. Corbett and T. E. Osmond.[2]

4. *The Toxic Material from the Gonococcus.*

Having ascertained that the gonococcus protein precipitate * thrown down by acidification (from the original alkaline solution) was comparatively non-toxic it naturally occurred to me that the toxic properties of the germ would be found in the acid supernatant fluid, which was separated from the precipitate by centrifuging or by filtration. This belief proved to be correct; small doses of the supernatant fluid caused quite an intense local reaction when injected subcutaneously. The acid supernatant fluid was neutralised before injection, so that the local reaction produced was not due to the acidity of the fluid. This supernatant fluid has also a provocative effect in the disease, since it increases the symptoms and renders the urethral discharge more profuse; it was found to contain protein substances which can be precipitated by the addition of picric acid, ammonium sulphate, or absolute alcohol.

5. *Parallel Researches with other Proteins.*

These preliminary researches on the gonococcus led me to a similar study of other pathogenic organisms and of proteins in general. First of all I carried out a series of parallel experiments on germ protein (gonococcus), animal protein (ox heart), and vegetable protein (pea flour). The gonococcus, minced ox heart, and pea flour were easily soluble in N/1 NaOH, but a certain proportion of undissolved substance remained which could be removed by filtration.

Table I. shows the salient results of this investigation.

TABLE I.

Tests applied to minced ox heart.	Tests applied to gonococcus.	Conclusions.
N/1 NaOH added — Mince dissolved after standing 12 hours at 37·5° C. Distinct odour of ammonia.	N/1 NaOH added — Germs dissolved after standing 12 hours at 37·5° C. Distinct odour of ammonia.	Similarity in both.
Alkaline meat solution gives biuret, xantho-proteic, Millon, and other protein tests.	Alkaline germ solution gives biuret, xantho-proteic, Millon, and other protein tests.	Both solutions consist largely of alkaline meta-protein.
On neutralisation with N/1 HCl a heavy precipitate is thrown down giving a straw-coloured supernatant fluid which is decanted or filtered off.	On neutralisation with HCl a heavy precipitate is thrown down, giving a straw-coloured supernatant fluid which is decanted off.	Similarity in both.
In both tests the precipitate is easily soluble in N/10 NaOH and gives the protein tests. It is insoluble in neutral H_2O, neutral alcohol and ether.		Both precipitates consist of meta-protein.
In both tests the precipitate is readily soluble in 50 per cent. acid alcohol.		Similarity in both.
In both tests the supernatant fluid or filtrate gives the protein tests and yields a precipitate on half saturation with ammonium sulphate and with 70 per cent. alcohol. This precipitate is partly soluble in water.		Both supernatant fluids contain protein resembling proteose.†
In both tests the supernatant fluid from the primary proteose gives the protein tests and also a precipitate on full saturation with ammonium sulphate and also with excess of absolute alcohol. The precipitate is almost completely soluble in water.		Both supernatant fluids contain protein resembling deutero-proteose.‡

N.B.—All of the above tests apply equally, except for some very minor differences to the pea flour.

* The precipitate can be further detoxicated by alternate solution and precipitation repeated several times until the supernatant fluid no longer gives a precipitate with picric acid.

† The substance resembling primary proteose is precipitated with half saturation with ammonium sulphate and with 70 per cent. alcohol.

‡ The substance resembling deuteroproteose is precipitated with full saturation with ammonium sulphate and with absolute alcohol.

From these tests it appears very evident that the meat (ox heart), the gonococcus, and pea flour are very similar in nature, and that all three substances consist largely of protein, which can be split up into meta-protein, primary proteose, and deutero-proteose. The non-toxic gonococcus vaccine, already described, consisted of gonococcus meta-protein, and it is now evident that the toxic supernatant fluid contained primary and secondary gonococcus proteose.

6. *Antigenic and Therapeutic Values of the Gonococcus Proteoses.*

Having reached this stage of the investigation, one was naturally curious to know whether or not the gonococcus proteoses were the cause of the toxicity of the supernatant fluid already referred to in paragraph 4.

Experiments on gonorrhœal subjects showed that the primary and secondary proteoses from the gonococcus were no more toxic than the comparatively non-toxic meta-protein itself. They produced no marked local or general reaction such as fever and malaise. It was, however, noted that an injection of these proteoses caused quite a definite provocative reaction at the focus of the disease. Thus, when there was an existing urethral discharge a subcutaneous injection of gonococcus proteose caused an increased flow of pus within the next 48 hours; a return of discharge after the latter had dried up, or an increase of shreds in the urine of chronic cases, were also often induced in the same way. For these reasons a subcutaneous injection of the proteoses has been found useful as a provocative test of cure in gonorrhœa. In gonococcal iritis an injection of the proteose may cause an acute flare-up in the eye: it is, therefore, not recommended as a diagnostic test in this condition.

A certain amount of immunity appears to be developed against the proteoses, since after repeated injections they lose their focal provocative action. Moreover, I found that the primary and secondary proteoses were antigenic, as they gave positive results when used as antigens in the complement-fixation test for gonorrhœa. They appeared to be good antigens when precipitated with alcohol, and comparatively poor antigens when precipitated with ammonium sulphate. It is just possible that the ammonium sulphate alters them in some way.

7. *Alkali Solubility of other Germs and Proteins.*

Having ascertained that the gonococcus is easily soluble in N/10 to N/1 NaOH, and that minced meat is easily soluble in N/1 but scarcely soluble in N/10 NaOH, it naturally occurred to me that I should test the alkali solubility of other germs and proteins.

I found that the meningococcus was about as easily dissolved in alkali as the gonococcus, and that the influenza bacillus of Pfeiffer was even more soluble. When the meningococcus was dissolved in alkali and the solution brought back to the neutral point it was found to act as a good antigen in the complement-fixation test for cerebro-spinal fever. A gonococcal antigen gave positive results with the serum of meningitic cases, and a meningococcal antigen gave weakly positive results with the serums of gonorrhœal subjects. These facts are sufficient to show the close relationship between the two germs. This finding was confirmed by A. S. G. Bell.[4]

Other germs, however, were found to be much less soluble in alkali than the gonococcus; the *Micrococcus catarrhalis*, for example, shows scarcely any evidence of solution in either N/10 or N/1 NaOH. N/1 represents 4·2 per cent. NaOH, but the *M. catarrhalis* required for its solution strengths as high as 15 to 20 per cent. NaOH. Organisms of the typhoid, dysentery, and *B. coli* group were found to dissolve fairly easily in alkali, but were not so soluble as the gonococcus. Gram-positive organisms were, as a rule, but not always, more difficult to dissolve in alkali than Gram-negative germs; the pneumococcus and streptococcus were, as a rule, more easily dissolved than the various staphylococci. The most difficult germ of all to dissolve was apparently the tubercle bacillus. Various animal tissues also showed marked differences in alkaline solubility. Leucocytes (pus cells) were more easily dissolved in alkali than epithelial cells, and brain and testicular tissue was apparently more difficult to dissolve than muscle. It was found that antiformin, which consists of 15 per cent. NaOH + 15 per cent. sodium hypochlorite, was a much more powerful solvent than NaOH alone. Germs like the gonococcus, pneumococcus, and streptococcus, as well as those of the typhoid, dysentery, and *B. coli* group, can be dissolved in antiformin in a few minutes. The tubercle bacillus, on the other hand, is much more resistant, requiring several hours. Although all germs, and apparently all proteins, were found to be more or less soluble in alkali, it was noticed that some, like the gonococcus, appeared to dissolve entirely; others, such as diphtheroids and the tubercle bacillus, dissolved only partially and left a considerable amount of undissolved material behind. In all cases, however, a considerable amount of protein went into solution in the alkali; and all these solutions behaved in the same manner, as indicated in the table under paragraph 5. All gave the protein colour tests. Meta-protein was always thrown out by the addition of acid, and the acid supernatant fluids always contained proteins resembling proteoses.

8. *Further Biochemical Components of Germs and Other Proteins—viz., Acid-Soluble, Alcohol-Soluble, and Chloroform-Soluble Fractions.*

The above researches apparently proved that the various germs and proteins examined each contained an alkali-soluble protein material. A further study was

made with regard to the substances which remained insoluble in the alkali; the tubercle bacillus afforded the most striking example.

When a mass of solid tubercle bacilli is treated with twice its volume of antiformin and placed in the incubator for several hours it is apparent that a considerable part of the solid has gone into alkaline solution. The tube of the material, especially after centrifugalisation, separates more or less into three layers. In the bottom of the tube there is a heavy, insoluble substance, above this is a deep yellow fluid, and floating on the surface is a whitish, undissolved material of low specific gravity. The yellow fluid, which consists of the alkali-soluble protein of the tubercle bacillus, is separated from the insoluble parts by filtration through a fine paper. The insoluble substance is collected from the paper, placed in a tube, and treated with twice its volume of N/1 HCl. After standing for a few hours the acid mixture is also filtered through a fine paper.

The acid-soluble protein.—On examination of the acid filtrate it is found to give the protein colour tests. Moreover, when this acid filtrate is rendered definitely alkaline by the addition of N/1 NaOH, a white, flocculent precipitate is produced. When this precipitate is removed by centrifuging or filtration it is found that the supernatant alkaline fluid or filtrate contains proteoses which can be precipitated by addition of ammonium sulphate or alcohol.

This chloroform-soluble material may be precipitated by the addition of alcohol to the chloroform, and the precipitate may then be separated by filtration.

From the above analysis it is apparent that the tubercle bacillus can be split up into four main fractions or components.

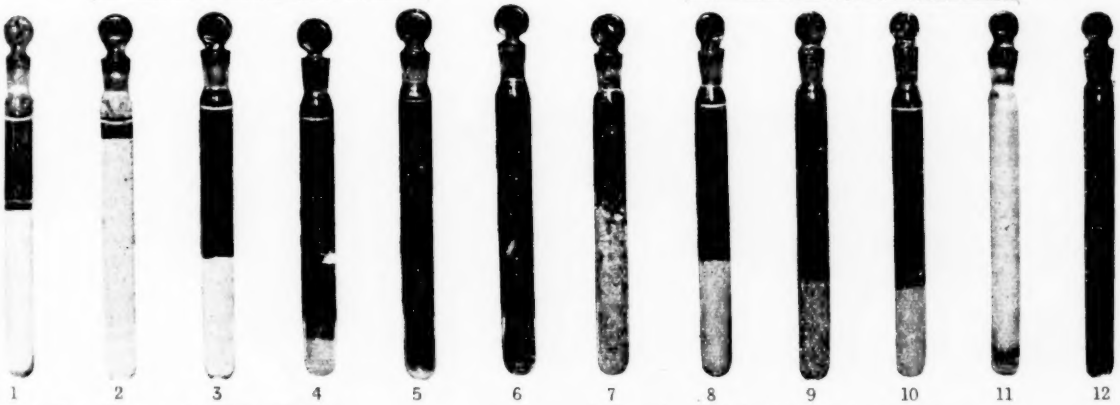
(*a*) Alkali-soluble meta-protein + proteoses.
(*b*) Acid-soluble meta-protein + proteoses.
(*c*) Alcohol-soluble substance.
(*d*) Chloroform-soluble substance.

For successful splitting up of the tubercle bacillus, as well as of other germs and proteins, it is interesting to note that the above order of analysis must be maintained. For example, if we first treat the mass of tubercle bacilli with N/1 HCl or with alcohol at blood heat, practically nothing is dissolved away. It would almost seem that these four fractions of the germs are closely compounded and cannot readily be dissolved out separately until the compound has been broken up with alkali or antiformin.

QUANTITATIVE BIOCHEMICAL ANALYSES OF THE GONOCOCCUS (FIGS. 1–6) AND THE TUBERCLE BACILLUS (FIGS. 7–12).

Detoxicated Gonococcus Vaccine
(contains all of the non-toxic antigenic fractions shown below).

Detoxicated Tubercle Bacillus Vaccine
(contains all of the non-toxic antigenic fractions shown below).



1. Mass of gonococci, unchanged, toxic.
2. Gonococcus, meta-protein, alkali-soluble, non-toxic, antigenic.
3. Gonococcus, proteose, alkali-soluble, non-toxic, antigenic.
4. Gonococcus, protein, acid-soluble, non-toxic, antigenic.
5. Gonococcus, lipoid (?), alcohol-soluble, non-toxic, antigenic.
6. Gonococcus, endotoxin, toxic, not antigenic.

Note the relatively large amount of alkali-soluble protein present in the gonococcus, whereas the amount of alcohol-soluble substance (lipoid ?) is very small. The intracellular toxin in the right hand tube is in solution and its brown colour is not demonstrated in the photograph.

7. Mass of tubercle bacilli, unchanged, toxic.
8. T.B., meta-protein, alkali-soluble, non-toxic, antigenic.
9. T.B., proteose, alkali-soluble, non-toxic, antigenic.
10. T.B., protein, acid-soluble, non-toxic, antigenic.
11. T.B., lipoid (?), alcohol-soluble, non-toxic, antigenic.
12. Tubercle bacillus, endotoxin, toxic, not antigenic.

Note the large amount of alcohol-soluble substance (lipoid ?) present, which is light and tends to float to the top. The quantity of alkali-soluble protein is much less than in the case of the gonococcus. The intracellular toxin in the right hand tube is in solution in alcohol, and its brown colour is not demonstrated in the photograph.

Before proceeding further let us note that we have isolated from the tubercle bacillus the following components:—

(*a*) An alkali-soluble meta-protein which is precipitated with acid and whose acid supernatant fluid contains proteoses.

(*b*) An acid-soluble meta-protein which is precipitated with alkali and whose alkaline supernatant fluid also contains proteoses.

Now (*a*) behaves to an alkali as (*b*) behaves to an acid; conversely (*a*) behaves to an acid as (*b*) behaves to an alkali; so that as far as acids and alkalis are concerned their action is diametrically opposite. Indeed, it would almost appear that protein (*a*) is negatively charged with hydroxyl-ions, and that protein (*b*) is positively charged with hydrogen-ions.

(*c*) *The alcohol-soluble substance.*—Returning again to our chemical analysis of the tubercle bacillus it is found after the alkali and acid soluble proteins (*a*) and (*b*) are dissolved therefrom that a residue still remains. This residue is now treated with three times its volume of absolute alcohol, and after standing for an hour the mixture is filtered. When we add to this alcoholic filtrate twice its volume of water a dense white cloud appears in the fluid. After standing for one or two days the fine colloid particles of this white cloud clump together into masses, which usually float towards the surface of the liquid. I take it that this white precipitate of low specific gravity, which is thrown out of alcoholic solution on the addition of water, is of the nature of a lipoid or lipo-protein. This lipoid alcohol-soluble substance is insoluble in acid and even in boiling NaOH. The lipoid precipitate when first formed is so fine that it will pass through a filter paper. After standing for two days, however, the particles, having clumped together, are easily removed by filtration from the alcohol-water medium.

(*d*) *The chloroform-soluble substance.*—After successive treatments with alkali, acid, and alcohol respectively, it is found that an appreciable quantity of the tubercle bacillus substance is still left undissolved; but this remnant appears to dissolve entirely in chloroform.

9. *Content of Different Germs and Proteins: Same Types but Varying Proportions of Component Substances.*

Having definitely ascertained that the tubercle bacillus is made up of the four distinct components described above, one turned again to make a more careful analysis of the gonococcus. The gonococcus had at first appeared to consist almost entirely of alkali-soluble material, but careful analysis of a large mass of this germ, amounting to 20 c.cm. of solid wet substance, revealed that the organism also contained acid-soluble and alcohol-soluble fractions: no chloroform-soluble substance was detected. Large masses of many other species of germs and proteins were now treated in the same manner; it was found that all contained the fractions (*a*), (*b*), and (*c*), whilst some also contained the chloroform-soluble fraction (*d*).

In this series of analyses the interesting fact was revealed that each different germ and each different animal tissue contained the various components common to all in widely varying proportions. I have not sufficient space here to give the results of my whole series of analyses, but Table II. will suffice to demonstrate my contention.

It must be noted that the percentages given are very approximate, being estimated from the volume of wet precipitate obtained after centrifuging. Much more accurate results would be obtained by weighing the dried precipitates. In spite of the crudeness of my methods the results are striking. I am indeed convinced that by

developing this method of technique we shall be able in the future to diagnose accurately the different species of tissues and of germs and even of the different strains, by pure biochemical analysis.

Even with the crude volumetric measurements which I have employed one can detect distinct differences in the biochemical composition of such closely allied organisms as *B. typhosus*, *paratyphosus A*, and *paratyphosus B*. I have already pointed out that

TABLE II.—*Percentages of Content.*

Germs or proteins.	Tubercle bacillus.	Gonococcus.	Staphylococcus.	B. typhosus.	B. coli.	Ox heart.	Ox testicle.
Alkali-soluble substance	28	75	48	60	25	76	36
Acid-soluble substance	25	7	26	27	26	10	22
Total proteose	7	17	3	11	44	8	7
Alcohol-soluble substance	32	1	23	2	5	5	34
Chloroform-soluble substance	8	0	0	0	0	1	1

some germs and tissues are very easily dissolved, even in weak alkali, whilst others are very difficult to dissolve and require strong solutions like antiformin. My analysis of many varieties of germs and tissues brought to light the interesting fact that this solubility depended upon the lipoid content of the germ or tissue. The less the amount of alcohol-soluble substance (lipoid) present the greater is the solubility in alkali, and vice versa. The influenza bacillus contains only the merest trace of lipoid, and is in consequence very soluble even in N/10 NaOH. The tubercle bacillus, on the other hand, contains some 32 per cent. of alcohol-soluble material, and on this account is very resistant to alkaline solution. It requires the action of antiformin for several hours. This fact is indeed so striking that one can prophesy a low lipoid content in a protein which dissolves readily in weak alkali; and conversely, when a protein disintegrates with difficulty it assuredly contains a high percentage of this alcohol-soluble material. (See Figures.)

10. *Antigenic and Comparatively Non-toxic Nature of Protein Split Products Described Above.*

In the early part of my investigation I had ascertained that the alkali-soluble fraction of the gonococcus was antigenic, as estimated by the complement-fixation reaction and by the therapeutic results obtained when injected into gonorrhœal subjects. It was found, moreover, that this alkali-soluble fraction was very much less toxic than the actual germ itself. Further, the proteoses associated with the alkali-soluble fraction were also antigenic, and although they had a provocative power they were nevertheless comparatively non-toxic.

Similar experiments were now carried out with regard to the acid-soluble, alcohol-soluble, and chloroform-soluble fractions. It was found that the two former components gave good results when used as antigens in the complement-fixation test for gonorrhœa. Further inoculation experiments in human subjects showed that they were apparently no more toxic than the alkali-soluble component of the germ. These experiments were repeated with the component parts of the tubercle bacillus, with approximately the same results.

E. P. Pick[7] and other observers have inclined to the belief that the alcohol-soluble "waxy" substances from the tubercle bacillus and other germs were toxic and non-antigenic, but it would appear that this belief is erroneous. It is now well known that lipoid substances may be highly antigenic, one of the most notable examples being the alcoholic extract of heart employed in the Wassermann test. Lipoids, moreover, are not necessarily highly toxic, since the staphylococcus contains a large amount of alcohol-soluble substance, and yet is one of the least toxic of all germs. Pfeiffer's bacillus, on the other hand, is very highly toxic, yet it contains practically no lipoid or alcohol-soluble material.

References.—1. Bell, A. S. G., and Harmer, I. M.: THE LANCET, 1918, ii., p. 43. 2. Corbett, W. V., and Osmond, T. E.: Treatment of Gonorrhœa with Detoxicated Vaccine, THE LANCET, 1920, ii., p. 346. 3. Dixon, H. B. F., and Priestley, A. H.: Complement-fixation Test in Gonococcal Infections, THE LANCET, 1919, ii., p. 964. 4. Lees, D.: Detoxicated Vaccine in the Treatment of Gonorrhœa, THE LANCET, 1919, i., p. 1107. 5. Ditto: Edin. Med. Jour., 1919, August. 6. Magner, W.: The Complement-fixation Test in Gonorrhœa, THE LANCET, 1920, ii., p. 123. 7. Pick, E. P.: Immunitätsforschung, Kraus und Levaditi, 1907-8, vol. i., pp. 331-562.

Dr. Dan McKenzie has been elected Corresponding Fellow of the American Laryngological Association.

OBSERVATIONS UPON A CASE OF FILARIA (LOA) LOA INFECTION.

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AND

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General Symptoms.

INFECTIONS with the nematode parasite *Filaria loa* (*Loa loa*), though often exhibiting few or no clinical symptoms of any definite importance, are nevertheless of great interest to the filariologist. Occasionally the adult parasites in their wanderings about the connective tissues pass under the conjunctiva on to the eye, and they have been removed from this position in many instances. Such an occurrence as a worm in the eye naturally makes a great impression on the layman, who does not forget it when he comes to detail his troubles to the doctor. Calabar swellings, swellings of a fugitive nature, about the size of a pigeon's egg or larger, are also met with; these come up suddenly, are painless, do not pit on pressure, and generally disappear in two or three days of their own accord. In rare cases[1] a generalised swelling of a part is met with or a pruritic condition may be seen, while in one case there was great pain in the eye with photophobia. We have recently seen a case where, instead of a small local swelling, there was a generalised swelling of the forearm of the nature of a solid œdema. This lasted for a considerable time and ultimately disappeared. When the adult worms are near the surface they often give rise to pricking sensations with itching, and the patients soon get to know those and can locate where the worm is quite accurately.

Pathogenesis of Calabar Swellings.

Students of the subject will remember that Sir Patrick Manson suggested[2] that the Calabar swelling might be produced by the adult female worm giving birth to a generation of embryos at that spot, and in one case he demonstrated embryos from such a swelling. The experiment was vitiated, however, by the fact that the patient had many embryos in the peripheral blood at the time; their presence in the films was no doubt due to the needle wounding blood-vessels on its way in. That such was so one of us (G. C. L.) was able to demonstrate recently in a case of *F. loa* infection where there were no embryos in the peripheral blood. In this instance, though the Calabar swelling—which was a perfectly typical one—was punctured in many directions, no embryos could be detected in the juice aspirated.

There is no doubt that those swellings are caused in some way or other by the worms; they are probably due to the excretion of a toxin into the tissues, a possibility rendered still more likely in such cases by the fact of the presence of a well-marked eosinophilia as well. This eosinophilia is a very constant feature, the numbers varying between 12 and 20 per cent. as an average. In the absence of other causes one has been able to diagnose loa infections correctly by this feature alone.

Diagnosis.

Four distinct points will help one, then, in diagnosing *F. loa* infection: (1) the actual presence of the adult worm or worms, have any been extracted from or definitely seen in the eye? (2) the presence of *F. loa* embryos in the peripheral blood—they are easily differentiated from *F. bancrofti* embryos by anyone who has studied the subject closely; (3) the presence or definite history of Calabar swellings; and (4) eosino-

[1] Low, G. C.: Jour. of Trop. Med. and Hyg., Jan. 2nd, 1911.
[2] Trans. Soc. of Trop. Med. and Hyg., vol. iii., No. 5.

philia in people from the endemic area, with nothing else to explain its presence.

One or more of those cardinal symptoms may be present in any individual case. Embryos are often absent from the peripheral blood; this absence, often of a prolonged nature, is difficult to explain. Those interested may consult the paper on this subject already mentioned.[1]

History of the Case.

B., male, aged 28. Admitted to Hospital for Tropical Diseases Jan. 21st, 1921. Born in Scotland; went abroad to Southern Nigeria 1914; Cameroons 1916; came home to U.K. December, 1920, this being his fourth leave home.

Previous illnesses.—Suffered a good deal from malaria; gastritis in 1918; diarrhœa once; no definite clinical dysentery.

Present illness.—Went to doctor for fever in Nigeria November, 1920; an examination of the blood for malaria showed the presence of diurnal filarial embryos, as well as malarial parasites. On arrival in England as fever was still troubling the patient; he came into the Hospital for Tropical Diseases to have it treated.

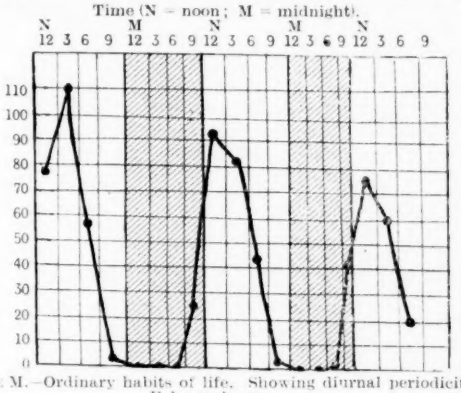
Examination.—Temp. raised; spleen enlarged. These symptoms quickly disappeared on proper doses of quinine being administered, and, of course, had nothing to do with the filarial infection.

Filarial history.—No definite Calabar swellings; (?) perhaps one. Knocked his right forearm one day; on the same day his right hand became swollen, remaining so for two days, after which it went down of its own accord. No history of worm ever being seen in eye.

Blood examination.—Many *F. loa* embryos present in day blood; none in night blood. Also a few *F. perstans*. No malarial parasites found.

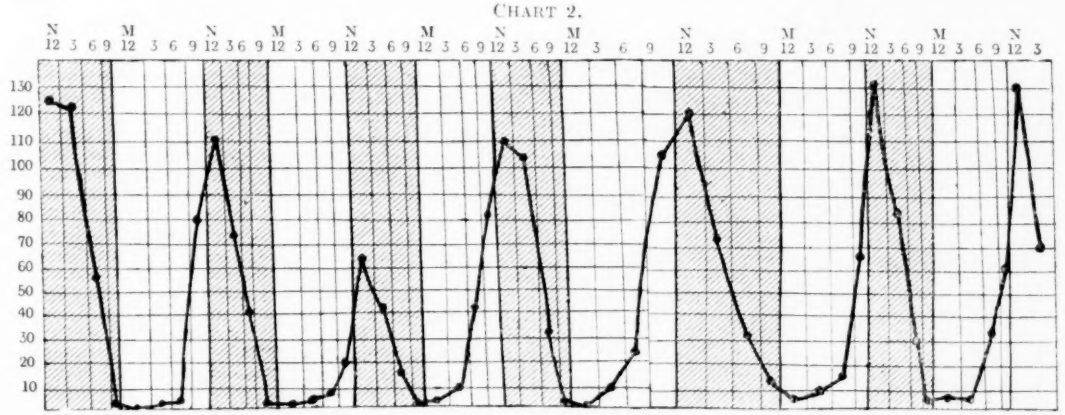
CHART 1.

In each of the Charts the shaded portions represent the time during which the patient slept. The figures at the side are the numbers of *F. loa* embryos in 20 c.mm. of blood.



CASE M.—Ordinary habits of life. Showing diurnal periodicity of *F. loa* embryos.

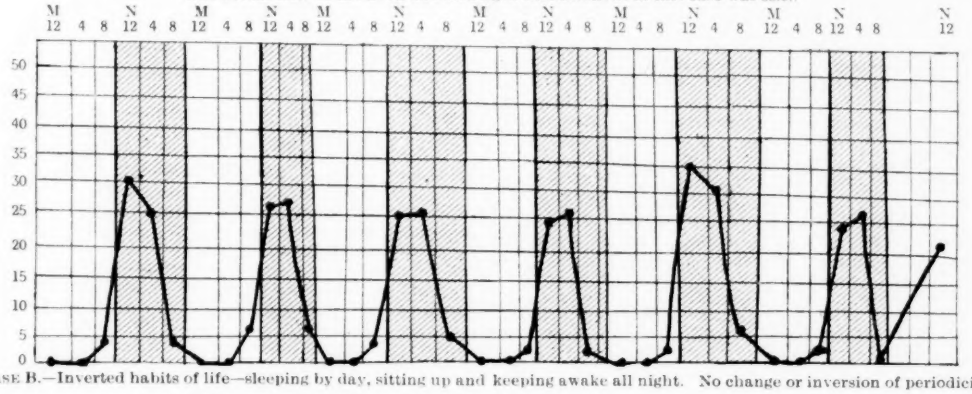
CHART 2.



CASE M.—Inverted habits of life—sleeping by day, sitting up and working at night. No change or inversion of periodicity.

CHART 3 (Case B).

(The actual time of the noon and midnight examinations in this case was 12.5.)



CASE B.—Inverted habits of life—sleeping by day, sitting up and keeping awake all night. No change or inversion of periodicity.

Count of corpuscles.—R., 4,108,000. W., 8800. Hb, 90 per cent. Differential: P.M.N., 45 per cent.; L.M., 6 per cent.; L., 31 per cent.; E., 18 per cent. = 100. Slight anæmia then, due, no doubt, to the malarial element in the case. Well-marked eosinophilia.

Stool examinations.—No ova of any helminths present. No protozoa.

Urinary examinations.—Nothing abnormal, no albumin, blood, or sugar.

Subsequent history.—The routine blood examinations will be seen on the charts.

In March a typical Calabar swelling developed on the right wrist, thus it will be seen that the patient had eventually three of the cardinal signs of the infection—viz., the Calabar swelling, the day embryos of *F. loa*, and the eosinophilia.

Experiments upon the Periodicity.

Filarial periodicity has never been satisfactorily explained, though many theories have been put forward from time to time. The term has been applied to the presence in the blood of the embryos of *F. bancrofti* by night and their absence by day, or conversely, in the case of *F. loa*, to their absence by night and their presence by day. Chart 1 shows the diurnal periodicity of *F. loa* very well. The maximum number of embryos are in the blood about midday or a little later and quite absent from the blood at night. This regular

habit goes on day by day without much variation. One of the suggested explanations of periodicity is that it is due to the habits of the intermediate host, this being nocturnal in the case of *F. bancrofti*, diurnal in the case of *F. loa*. This, however, will not explain the non-periodicity of most of the other filaria, such as *Dirofilaria immitis* of the dog, whose intermediate host is nocturnal, *F. perstans*, and *F. demarquayi*; nor does it completely explain the non-periodicity of the South Sea variety of *F. bancrofti*. The possibility of the latter being a different species, or at least a distinct sub-species, still remains. If not that, at any rate it is a very well marked variety, differing from the common *F. bancrofti* in other respects (pathologically) as well as in its irregular periodicity.

Inversion of Periodicity.

Stephen Mackenzie first showed that it is possible to change the periodicity of *F. bancrofti* by changing the habits of the patient—e.g., by making him sit up all night and sleep all day. If this is done the periodicity changes right round, the embryos now appearing in the peripheral blood by day and not by night.

Many years ago now (1904) one of us (G. C. L.) had the opportunity of trying a similar experiment on a case of *F. loa* infection, under the care of Sir Patrick Manson at the Albert Dock Hospital. Though the protocols and details of this work have never been published, mention of the bare fact that the experiment was unsuccessful has appeared from time to time in the different editions of Sir Patrick Manson's book on Tropical Diseases. I have had the opportunity of verifying those facts again, in the case at present under discussion, and have found that they harmonise completely with those obtained in 1904; it may therefore not be out of place to publish them together now. For convenience the results have been put in the forms of charts (Charts 2 and 3) and a perusal of those will show that though the habits of the patient were completely inverted no corresponding change in the periodicity of the embryos took place, this being in direct opposition to similiar experiments on *F. bancrofti*, as just mentioned above. In both cases the patients went to bed at 9 A.M. and stayed there till 9 P.M. At the latter hour they got up and sat up all night, reading or doing some work about the wards. Both slept well during the day. Measured quantities of blood as first recommended and practised by one of us in 1903[3] were always taken, the standard quantity of 20 c.mm. being adopted.

Attempts to Eradicate the Infection by Antimony.

A series of antimonium tartaratum injections were given intravenously to determine if they would have any effect on eradicating the infection. They failed entirely, just as they have done in a series of cases of *F. bancrofti*, treated in a similar manner by ourselves.[4] A table of the examinations made and the amount of antimony injected has been constructed similar to those on our *bancrofti* cases, and a glance at it gives all the details necessary. There might be a slight diminution of the numbers of embryos towards the end of the course, but even this is not certain. A total of 25 gr. of antimonium tartaratum in all was given, the injections having no bad effects upon the patient.

In addition to the *F. loa* infection there was also a scanty infection of *F. perstans*, not sufficient, however, to do any accurate counts upon. These were not destroyed by the antimony either, an interesting observation, as this embryo is non-sheathed, and some have suggested that it is the sheath of the *bancrofti* and *loa* embryo that protects them. As regards eradication of the infection, of course, this is not the point; it is no use destroying the embryos, even if we could, so long as the adults are not destroyed, as the latter cause the symptoms, and if still alive will go on pouring embryos into the blood stream. The embryos are just an index or means of determining what effect, if any, the drug used is having on the adult worms. Whenever those are destroyed, as by an attack of lymphangitis in *F. bancrofti* infections, then the embryos quickly disappear from the blood and do not return.

Table Showing Examinations made and Amount of Antimony Injected (Case B).

A = number of *F. loa* embryos in 20 c.mm. of blood.
B = number of grains of tartar emetic injected, these being given in the afternoons between 4 and 5 P.M.
The examinations were made at 12 noon on every occasion.

1921.	A	B	1921.	A	B	1921.	A	B	1921.	A	B
Jan.			Feb.			Feb.			Mar.		
24	32		7	30		23	15		9	14	
25	37		8	20		24	18		10	21	2½
26	40		9	23	½	25	14	2	11	10	
27	44		10	37		26	21		12	20	
28	35		11	25	½	27	14		13	15	
29	30		12	34		28	16	2	14	17	2½
30	27		13	30		Mar.			15	10	
31	25		14	27	1	1	15		16	11	2½
Feb.			15	15		2	12		17	10	
	24		16	25	1	3	17		18	10	2½
2	35		17	24		4	11	2½	19	12	
3	24		18	12	1½	5	18		20	22	
4	21		19	20		6	12		21	15	
5	15		21	22	1½	7	15	2½	22	20	
6	12		22	10		8	19				25 gr.

J. B. Christopherson has recently again raised the question of the non-toxicity of large doses of antimony in different tropical affections in which this drug is used. We agree with him that, with ordinary care, there is little or no danger in giving such injections, and that if necessary large amounts may be given, as in our own series of cases of bilharzia.[5] In cases of kala-azar and ulcerating granuloma quantities up to 53½ gr., 64½ gr., and even 114 gr. have been administered by us. In most of the tropical diseases now being treated with antimonium tartaratum such large amounts will not be found necessary, 30 to 40 gr. probably being the maxima required. The methods of giving the drug and the slight toxic symptoms which may follow its administration are now so well known that it is quite unnecessary to reiterate them here. These details may be studied in the paper referred to above and in the different publications of Christopherson and others.

[3] Filaria Perstans, Brit. Med. Jour., March 28th, 1903.
[4] THE LANCET, 1920, ii., 551, and 1921, i., 221.

SPINAL ANÆSTHESIA FOR SUPRAPUBIC PROSTATECTOMY.

BY H. M. PAGE, F.R.C.S. ENG.,
ANÆSTHETIST TO THE WEST LONDON HOSPITAL.

A FORMER report on this subject was published in THE LANCET of May 15th, 1915. Since then, owing to the kindness of Mr. John Pardoe and Mr. Sydney MacDonald, I have greatly increased my experience in the use of this method of anæsthetising for suprapubic prostatectomy, with the result that though I still use it for choice in almost every case I have modified my technique in some particulars.

I now use a 10 per cent. solution of stovaine (Billon's) without the addition of glucose. I have gradually cut down the dose of stovaine to a maximum of 0·03 of a gramme (three-tenths of a cubic centimetre of a 10 per cent. solution). In some cases, on account of great age, a much broken-down constitution, or comparatively low blood pressure, I have used a dose of 0·025 of a gramme of stovaine successfully. The patient is always operated on with the table slightly inclined, head downwards, and this position should be retained for carrying the patient back to bed, and when in bed until all effects of the spinal injection have passed off. The foot of the bed should be raised high enough to make a more decided slope than that of the operating-table. The Trendelenburg position can of course be used if desired. In every case I produce unconsciousness, never surgical anæsthesia, by administering some general anæsthetic in combination with oxygen.

[5] Low, G. C., and Newham, H. B. G.: THE LANCET, 1919, ii., 633.

According to the condition of the patient, I have used nitrous oxide and oxygen and ether, A.C.E. and oxygen followed by ether and oxygen, or ether and oxygen alone. A subcutaneous injection of morphia and atropine, of a dosage suitable to the age and condition of the patient, is given half an hour before the operation.

I still inject in the second lumbar space, with the patient lying on his side. I withdraw very little more spinal fluid than the quantity of solution I am going to inject. My experience in the use of spinal anæsthesia for these cases and for a great number of operations in general surgery has made me think that the best way to avoid after-headache is to withdraw little spinal fluid, use as fresh a solution of stovaine as possible, and avoid collapse by position maintained until the effect of the spinal injection has completely passed off.

In the preparation of the patient I avoid starvation as much as possible, and he should be allowed to drink water up to the time of operation. It is a great advantage to the patient to continue to drink water up to the time of the administration of an anæsthetic for every kind of operation, provided there is no obstruction in the alimentary tract. Dehydration is prevented, the stomach is washed clean, and the risk of post-anæsthetic vomiting is diminished.

Results from the Modified Technique.

With the use of the above technique I have had no trouble or anxiety during the operation. In every case there has been good relaxation of the abdominal muscles. There has been no stovaine collapse and no increased tendency to recurrent hæmorrhage. Headache has been extremely rare and negligible. As the general anæsthesia is not carried to the surgical degree and is of very short duration, the patient recovers from it with extreme rapidity, even if a chloroform mixture or ether has been used, and soon takes drink and food. There has been no post-anæsthetic vomiting. In every case the patient has left the table in an exceedingly good general condition. There has been no case of immediate death, and the operative mortality, including the cases in my first report, has been under 5 per cent. The list of cases contains a large percentage of the aged, two over 90 years old, and a full proportion of patients with broken-down constitutions. I have not yet found it necessary to use spinal anæsthesia for a preliminary cystotomy.

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

A CASE OF ACUTE APLASTIC ANÆMIA.

BY F. E. LARKINS, M.D.

ATTENTION has recently been directed to the risks arising from exposure to gamma rays, and the following case is reported to sound a note of warning.

A. B., aged 43, had been working at radiography for 15 to 18 years. He was of excellent physique, and for the past 18 months had been putting on weight; his general health had never been better. His complexion was always sallow, a fact which, unfortunately, masked the onset of the fatal anæmia.

In October, 1920, a blood count was taken, one might say quite accidentally, as far as the present illness was concerned, but which, in view of subsequent events, turned out to be of great interest. The result then was:—

Blood count: Reds, 4,200,000; whites, 7200; Hb, 85 per cent.

*Differential leucocyte count**: L., 38 per cent.; P., 60 per cent.; E., 1·7 per cent.

This suggests that at that time disease had already actually begun—that is, five months before its termination and three months before any symptoms were complained of.

In January the patient's colour was noticeably changing from his normal sallow to a peculiar lemonish tinge. He then began to complain of shortness of breath and loss of appetite. He still kept on working at high pressure, and refused to consult anyone. On Feb. 4th, however, he gave in. At this stage he was well nourished and of powerful physique. His temperature was 100·6° F. at night, pulse 90, and he now said he thinks he had been running a night temperature for a month past. This temperature came on regularly every afternoon at about 4 o'clock, and increased to 10 P.M. with intense backache. His blood pressure was 110. Slight dilatation of heart with hæmic murmur at the apex. He had a troublesome cough, and a few moist sounds were found at both bases.

Blood count: reds, 2,700,000; whites, 1600; Hb, 54 per cent.

Differential count: L., 76 per cent.; P., 20 per cent.; E., 3 per cent.

Thus showing a serious drop in both red and white corpuscles and complete inversion of the ordinary percentage relation of lymphocytes to polymorphonuclears. No poikilocytosis, no nucleated reds, no variation in the size of the red cells were to be seen. Urine showed nothing.

He was put to bed, given arsenic by mouth, and daily injections of cacodylate of iron and strychnine, and salicin 10 gr. every day to control the intolerable backache he got every evening with the temperature. During this first week he appeared to improve. His temperature came down, his appetite got better, and he seemed stronger.

Owing to the possibility of an infective endocarditis I had his heart examined by Dr. Strickland Goodall, who came to the conclusion that there was none present, but that it was purely a hæmic heart. Bacteriological examination of the blood on two separate occasions gave a negative result. Septic foci were sought for from every conceivable source, but none were found anywhere excepting for one septic tooth which was extracted.

At this stage he appeared so much improved that I let him go to the country to pick up. In a week he had to come back, as his temperature had run up to 103° at night and he was evidently much worse.

On Feb. 21st his red cells had dropped to 2,850,000 and hæmoglobin to 45 per cent. His urine now showed a trace of albumin with a few blood discs. The fæces were examined for blood but none found. His nose began to bleed, slightly oozing in the night; severe headache complained of; chest clear; pulse 88–90; temperature, 100°–101°.

On March 1st cerebral symptoms began to be noticed in some loss of memory and clearness, which previously had always been acute. On the 6th blood count still showed a steady rapid fall.

Blood count: Reds, 1,350,000; whites, 1050; Hb, 26 per cent.

Differential leucocyte count: P., 20 per cent.; L., (large) 72 per cent., (small) 6·5 per cent.; E., 5 per cent.; B., nil; H., 1 per cent.

Macrocytes and microcytes present; poikilocytosis present; no nucleated reds.

March 9th: Complained of blurring of vision in right eye.

10th: Ditto in left eye. Examination showed extensive retinal hæmorrhages in both eyes. Temperature still ran between 100°–101° every evening, with morning drop to normal. Pulse steadily rose to 90–100.

It was now decided to resort to transfusion of blood. Patient's blood was tested for agglutination and was found to be of group 4, and a group 4 donor was procured.

16th: Mr. Norman Lake transfused 9½ oz. of blood. This was followed by a very severe rigor and intense general discomfort. Temperature rose to 105·2°; pulse to 150.

17th: He felt and looked somewhat better and the temperature dropped to 99·2°. Nose began to bleed slightly.

18th: Nose oozed continuously and nothing could stop it. The temperature rose again to between 101°–103° and pulse about 120. The headache, which previously had been troublesome, left him. He still took his food very reasonably well and was constantly sleeping.

19th: Blood count was again taken. It will be seen that a very noticeable change had taken place in the differential count.

Blood count: Reds, 1,005,000; whites, 840; Hb, 18 per cent.

Differential count: P., 41 per cent.; L., (large) 54 per cent., (small) 4 per cent.; E., nil; B., nil; H., 1 per cent.

Poikilocytosis present; macrocytes and microcytes present.

21st: The heart got rapidly weaker and the patient died.

Commentary.

The rapid diminution in the red and white corpuscles was very noticeable in this case, the reds disappearing at the rate of roughly 250,000 a week. The colour index was never over 0·9. The differential leucocyte count was remarkable, especially as it corresponds exactly to Dr. A. E. H. Pinch's two cases of a similar nature, that have been, or are just about to be, reported, due to the effect of radium, and which ran an almost identical course.

There seems no other possible cause for the onset of this case other than X rays, and the interesting thing about this is that this radiographer had recently changed over from the soft tubes to the hard tubes for the greater part of his work. So the warning to be got from this case is that the protection hitherto employed in the use of harder tubes is not efficient. Further, it would appear advisable for radiographers and all those who are employed in radiographic work or with radium to have their blood examined periodically—say every six months—as by so doing the disease could be recognised at a very early stage, and probably be stopped.

In this case the transfusion did not appear to help in arresting the progress of the disease in any way, but I understand that in children with aplastic anæmia not due to X rays or radium it has been employed with excellent results.

* P. = polymorph. L. = lymphocyte. E. = eosinophile. B. = basophile. H. = hyaline.

A NOTE ON

A SMALL OUTBREAK OF DYSENTERY IN A PROVINCIAL TOWN.

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AND
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CASES of dysentery in England at the present time are of some importance in view of its importation by large numbers of men who have been in the Eastern theatres of war. Following is a brief description of a recent small outbreak in the town of Warrington with the bacteriological findings.

One of us (J. S. M.) was called on Sept. 6th, 1920, to see a girl, aged 5 years, who was suffering from tenesmus and frequent stools, largely, and at times wholly, composed of blood and mucus. On the 15th her brother, aged 9 months, took ill with the same complaint, but in a more severe form. He had about 20 motions per diem, frequently passing only pure blood. Temperature ranged from 101 to 105° F.; the child died on the 25rd.

On the 22nd in the next house but one in the same row a child (I. K.), aged 6 years, was attacked; and in succession the following children in the same family fell ill; on the 28th, her brother (H. K.), aged 10 years; on the 30th (L. K.), aged 11; on Oct. 2nd (E. K.), aged 8. I. K., H. K., L. K., were all seriously ill with tenesmus, frequent stools, 18-20 per diem, with passage of blood and mucus; after the end of a week from the onset of the illness, only shreds of tissue were seen in the stools. E. K. had the disease in a milder form; the stools, although containing blood and mucus, only numbered 8-10 per diem. There was another child who was only ill for a day with one attack of diarrhœa. The mother and father were not attacked.

On Oct. 3rd two adult females, the occupants of the house at the end of the row, 30 yards distant from the heavily infected house, were attacked with severe diarrhœa. The clinical features in all except the two last mentioned were those of true dysentery—tenesmus, frequent passage of blood and mucus in stools, which at the end of a week changed to tissue shreds, tenderness over splenic flexure and descending colon, flushed face, furred tongue, and temperature from 101° to 102°. There was no vomiting.

Treatment consisted in withholding milk and giving beef-tea, thin arrowroot gruel, thin, well-strained pea soup, and egg-albumin water. Bismuth carbonate, catechu, and 2 minim doses of liq. opii sedativus every four hours. On Oct. 16th all were convalescent, with only one or two normal stools per diem.

A stool from the boy (H. K.) containing only tissue shreds was sent to one of us (H. A. M.) for bacteriological investigation with the following result:—

Fæces from H. K. showed the presence of a few squamous epithelial cells, probably of extraneous origin, and a considerable amount of mucus, connective tissue, but no blood. Cultural examination revealed the presence of two organisms, one the *Bacillus coli*, the other belonging to the dysentery group. This latter organism was a Gram-negative bacillus, non-motile, giving a fine glistening growth on potato, and a very slight turbidity in broth. It produced no gas, but gave an acid reaction in the presence of the following sugars—viz., glucose, galactose, lævulose, and to a lesser degree in maltose and mannite. From this will be seen a close relation to the Y-type as described by Harris, Gay, and Woolstein [1 2 3].

The serum from two of the cases—viz., L. K. and I. K.—showed very strong agglutinative powers for this organism, and two others—H. K. and E. K.—also agglutinated it, but to a lesser degree.

Injected into guinea-pigs it killed in nine days, and post-mortem examination of one of these revealed a large subcutaneous abscess at site of inoculation, and another in the liver. There was also marked congestion of the intestine. The organism was obtained in pure culture from both abscesses. These results point to a *Bacillus dysenteriæ* closely related to the Y-type. (It might be observed that the organism responsible for ulcerative colitis, summer diarrhœa, and asylums dysentery, all fairly common in England, is not of this type but of the Shiga-Kruse type.[4])

The bacteriological examination thus confirms the clinical diagnosis, and it is interesting that the outbreak should be so localised. No source of infection could be traced; inquiry as to the presence of a discharged soldier or other person from an infected area proved negative. Railway stables across the street were investigated as to the presence of horses from abroad. Only one horse there had been to France. A sample of dung was examined for the organism and proved negative. The sanitary system is one of pail closets, and at the time of the outbreak the weather was warm—in fact, the warmest period of the summer—and flies were numerous. The clinical history shows that the virulence soon died out and that children were the chief sufferers.

[1] Jordan: General Bacteriology. [2] Marshall: Microbiology.
[3] H. T. Hewlett: Bacteriology.
[4] Hewlett: Trans. Path. Soc. Lond., vol. lv., 1904, p. 51.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

CLINICAL SECTION.

REPORTS AND EXHIBITION OF CLINICAL CASES.

A MEETING of this section of the Royal Society of Medicine was held on April 8th, Sir ANTHONY BOWLBY, the President, being in the chair.

Dr. IVOR J. DAVIES reported two cases of

Hair-cast of the Stomach,

together with an abstract of 108 cases.

CASE 1 was that of a woman, aged 34, who had always enjoyed good health until six months before admission to hospital. At that time her legs became swollen and shortly afterwards the abdomen swelled and gradually increased in size. She was breathless and complained of palpitation on exertion. Indigestion had been present for some years and now took the form of pain and vomiting after meals, with slight hæmatemesis on a few occasions. A few days before admission the arms swelled. There had been headache and sleeplessness and for eight months amenorrhœa. The urine had diminished and was passed with a little difficulty. There was a tendency to diarrhœa. The case was first regarded as an unusual form of pregnancy. In the out-patient department there was seen to be a moderate degree of œdema of the limbs. The abdomen was distended and found to be occupied by a large mass extending from the left hypochondrium, across and below the umbilical region, upwards to the right costal margin. It was crescentic in shape, with a sharp depression on its upper surface. The outline was definite, the surface hard, smooth, and free from tenderness. The mass was freely movable in all directions. The normal splenic dullness merged with that of the mass. The urine was normal. The case was admitted with a tentative diagnosis of splenic anæmia, but in the ward the idea of pregnancy was revived, since external ballottement was obtained and hard parts could be felt per abdomen, which were firm and rounded, were all connected, and could be moved freely, apparently in a fluid sac. Various other diagnoses were made. The vomiting increased.

At an operation by Mr. Cornelius Griffiths the stomach was found to be enormously dilated and filled by a compact mass of hair which formed a perfect cast of the stomach and pylorus. The weight of the hair-ball was 6½ lb.; its length along the greater curvature 24½ in., and its greatest circumference 12½ inches. The hairs varied from 6 to 12 inches long, and were dark and like those of the patient. The mass was thickly covered by a slimy foul mucus, together with flakes of sebaceous or adipocere material. The stomach wall was hypertrophied, and its mucous membrane inflamed in places; there were also areas like those of leukoplakia. An hour after the operation the patient died.

CASE 2 was that of a woman, aged 33, who had noticed an increasing lump on the right side of the abdomen for three years. For two years she had suffered at intervals from vomiting in the morning, but never after meals. Occasional slight pain was felt over the swelling. She was a healthy-looking, well-nourished woman. On abdominal examination a hard, smooth, rounded, movable, painless lump was found in the right lumbar region, but did not appear to fill the loin. There was dullness distinct from the liver dullness. At an operation by Mr. A. W. Sheen a hair-cast of the stomach, with a prolongation into the pylorus and duodenum, was removed. The stomach wall was hypertrophied. The mass was 21½ inches long and 11 inches in its greatest circumference, the appendage withdrawn from the pylorus being 7 inches in length. It weighed 3½ lb. A few adherent strands of cotton were seen on its surface, also a hook similar to one shown in the interior on subsequent X ray examination. There were a large papilloma in the lesser curvature and several smaller ones over the antrum pylori. These were removed. The patient made a full and speedy recovery, and was discharged 14 days later.

After referring to the radiographic appearances of the disorder, during which he exhibited some radiograms taken by Mr. Thurstan Holland of two cases which he described in detail, Dr. Davies dealt with the diagnosis. This was mainly one of differentiation between malignant disease and hair-mass. The early age, sex, long history, good health, and the particular features of the tumour were significant, and if radiographic methods were used there should be no difficulty in the diagnosis. The mobility of the stomach with

the enclosed mass and of the latter within the stomach, as made out by radioscopic palpation (Barclay and Ramsbottom) during fluoroscopic examination, were characteristic. History of hair-eating was seldom obtained, probably because the habit was, for the most part, unconscious. Small masses of hair might be passed per rectum, and lavage of the stomach might bring up a few strands of hair. According to Hausmann the presence of fatty acid plates and needles in the contents of the fasting stomach provided an additional feature. Butterworth in 1909 had collected 42 cases, Moore in 1914 53 cases, Ledra-Heazlit in 1914 70 cases, Matas in the same year brought the number of cases to 77, and the present paper concerned 108 cases.

Dr. B. T. PARSONS-SMITH showed a case of

Congenital Aortic Atresia.

The patient was a man aged 24. The symptoms were shortness of breath, even with slight exertion, pain in the left side of the chest, forcible beating of the heart, lack of ability for effort of any kind, frequent headache, giddiness, fainting sensations, general weakness of muscular power with excitement, and a functional incapacity of the lower limbs, particularly noticeable after resting. In March, 1915, the patient came up for military service, but general physical incapacity, which became manifest at the beginning of training, rapidly increased, and he was invalided four months later. In March, 1916, he again entered the army and in spite of recurrent disabilities remained at full duty for the greater part of the time until he was invalided in October, 1917. He was a pale-faced man of delicate appearance and his muscular development and general physique were distinctly below the average. The heart was enlarged, its rhythm regular, and the sounds clear. The second aortic sound was accentuated, the first sound at the apex was reduplicated, and a systolic murmur was audible in this region. The vessels were slightly thickened. Blood pressure readings were: systolic, 144 mm.; diastolic, 100 mm. Hg. There was no venous engorgement, no enlargement of the spleen, no clubbing of fingers, no cyanosis. Pulsation was exaggerated in the suprasternal notch and in the carotid and subclavian arteries, and there was a definite discrepancy in the pulses of the upper and lower extremities, those of the latter being diminished in size. Several thick-walled and tortuous vessels in the scapular region presumably indicated an anastomotic circulation between the arterial channels above and below the seat of the aortic occlusion. Electrocardiograms showed a bifid P wave in lead 2, a T wave whose ascending limb was unusually steep in lead 2, a slight increase in the length of the P-R interval which varied from 0·18 to 0·2 sec., and a bifid R wave in lead 3, the height of the second limb of the wave being conspicuously greater than that of the first. X ray examination confirmed the cardiac enlargement and showed a narrow aortic shadow extending to an abnormally high level.

The diagnosis was held to be congenital aortic atresia of adult type in which it might be inferred that the seat of the occlusion was situated below but in the vicinity of the entrance of the ductus arteriosus.

? Neoplasm of the Lung: Post-Mortem Findings.

Dr. M. CASSIDY reported the post-mortem findings of his case of ? Neoplasm of the Lung which was shown at a previous meeting of the section.[1]

The patient remained in good health till the end of January, 1921. During the first fortnight of February he had several slight hæmoptyses, and on the 16th he was readmitted suffering from great dyspnœa and stridor. He died two days later, having been at work up to four days before his death. A post-mortem examination, performed by Dr. E. Wordley, revealed a firm white growth which appeared to originate in the root of the left lung and had invaded the greater part of the lower lobe; the upper lobe, though free from growth, was completely collapsed, accounting for the upward and outward displacement of the apex beat observed clinically. The mediastinal glands were normal, and no other deposits could be found elsewhere. Histologically the appearances were those of endothelioma, though owing to much post-mortem autolysis an absolutely positive conclusion as to the nature of the growth was not possible.

Mr. C. W. G. BRYAN showed a case of Osteitis Fibrosa treated by resection of four inches of the humerus and insertion of boiled beef-bone graft.

Mr. G. MASSIE showed a case of

? Fibrocystic Disease of the Skull

in a girl, aged 21, who complained of inability to see properly from her right eye owing to increasing depression of the right eyelid.

[1] THE LANCET, 1920, ii., 1305.

She said that she had had a swelling of that side of the head ever since she could remember, but that during the previous three weeks a smaller swelling had appeared, which she thought was softer. She also complained of headaches. The Wassermann reaction was negative; nothing abnormal was found on physical examination; the urine was normal and there was no family history of syphilis. The smaller and softer swelling for which she had sought treatment had almost disappeared, the main mass of the swelling was about the same size, but a smaller lump had appeared in the middle of the forehead. She was unwilling to have an operation. Mr. Magnus Redding reported that the radiograms showed diffuse absorption of bone and overgrowth of imperfectly defined new cancellous bone (? osteoid tissue) affecting the right frontal bone. Both horizontal and vertical plates were affected. Osteitis fibrosa was suggested. There was a single small cystic cavity above the internal condyle of the right femur. Otherwise the lower limbs, pelvis, and spine showed no abnormality. The left frontal sinus was very much enlarged.

Dr. S. A. K. WILSON said that he had seen three cases resembling this one which had proved to be endothelioma of the bone, and in two of the three the endotheliomatous growth had extended inwards to the cortex as well as outwards. He asked whether there was any evidence of intracranial lesion in this case. He suggested operation. Two of the three cases he had seen had been operated upon by Sir Victor Horsley.—Mr. MAGNUS REDDING said that he would like to see the case in a year to see if there was any alteration. Osteitis fibrosa in other bones gave rise to appearances similar to those in this case.—Mr. MASSIE, in reply, said that the neurological examination revealed nothing abnormal.

Mr. PHILIP TURNER showed a case of

Cystic Tumour of the Left Cheek.

The patient was a man aged 45. The swelling had been present for about five years and was about the size of a walnut. The man stated that he went to bed one night and found it next morning. Since then the tumour had persisted and had not altered in size. Removal of a carious tooth while in the army had not affected it. The tumour appeared to be a cyst in the substance of the cheek and not adherent to the skin or mucous membrane, and though related to the superior maxilla, the inferior maxilla and the malar bone, not attached to these structures. X ray examination showed nothing abnormal. The tumour was in front of the parotid gland, which was not enlarged and did not swell during meals; saliva was normally excreted, Stenson's duct not obstructed, and the cyst could not be emptied by pressure. It had been suggested that the tumour was a lipoma or a dermoid cyst, but its sudden appearance was not in keeping with either of these views. On retraction of the cheek from the alveolar process of the upper jaw a small patch of mucous membrane showing a number of dilated vessels could be seen, an indication of an old nævus which had atrophied. He suggested that the cyst might have developed in a nævus and been due to a hæmorrhage.

Mr. W. H. OGILVIE showed a case of

Parovarian Cyst

in a baby of 3 months who had been ailing since birth and treated for marasmus and cough.

She was admitted into the hospital in the middle of December, 1920, with cough and dyspnœa, and bronchopneumonia developed. Early in January a lump was noticed in the abdomen. The abdomen was distended and tympanitic. In the left lower quadrant was a large globular elastic swelling, dull to percussion, and giving the sensation of fluid. It was only slightly movable and its lower border could be felt per rectum. The temperature was 103° F., the pulse over 180 and very feeble, respirations 60. There were patches of solid lung at both bases. An ovarian tumour was suspected owing to the presence of two abnormalities of congenital type: a large rugose vulva like a cleft scrotum and a partial stricture at the recto-anal junction. The preceding child had been born with a hare-lip. However, the fixity of the mass and the distension of the intestine led to the diagnosis of an inflammatory exudate, shut off between coils of intestine. Under chloroform anæsthesia the mass was felt to be spherical, and was displaced by manipulation from the hypogastric to the umbilical region, where it lay slightly to the right of the mid line. A right paramedian incision was therefore made, whereupon greatly distended coils of gut presented, and free serous fluid was found in the peritoneal cavity. A globular swelling about 4 in. in diameter was then exposed. As it could not be delivered it was punctured with a trocar and about 12 oz. of golden yellow fluid evacuated. The flaccid cyst was then drawn out, its narrow pedicle clamped, divided, and tied off, and the abdomen closed. The pedicle sprang from the right side of the pelvis. The

operation took 15 minutes, and the child made a slow recovery.

Dr. G. W. Nicholson reported that the cyst wall was denuded of epithelium, but as there was a well-developed parovarian in its walls there could be no doubt that it was a parovarian cyst. No ovarian tissue could be found. The fluid, according to Dr. J. H. Ryffel, was rich in protein and contained no mucin. There were some red blood cells and white cells, mainly polymorphs. Methæmoglobin was present and a little bile pigment or hæmatoidin.

The chief interest lay in the rarity of the case. Ovarian tumours were not common in childhood, and the majority of those which had been reported had been in children between the ages of 7 and 15, while the solid growths, either dermoids or sarcomata, outnumbered the cysts by about 3 to 1. Only 7 cases of ovarian cyst occurring in the first year of life were on record, and of these 5 were post-mortem reports. Successful ovariotomies were published by Sant Anna of Brazil in 1896 and by D'Arcy Power in 1898. Parovarian cysts were still more uncommon, and no case had previously been reported in a baby. It was hard to see how so large a cyst could have become impacted in so small an abdomen. There was no twisting of the pedicle, but the cyst wall showed at one place a well-defined area of pressure necrosis. He attached importance to the closure of the abdominal wall by mass sutures. Every minute saved in a laparotomy of a baby was of importance, while the delicate tissues had little power to deal with buried sutures even when of an absorbable nature.

Mr. OGILVIE also showed a case of

Multiple Brodie's Abscesses in the Scapula.

The patient, a boy now aged 17, was admitted into an infirmary in July, 1917, with subacute osteomyelitis of one week's duration, affecting the right femur and right tibia. Pain in the right shoulder was followed later by swelling, and the joint was drained for a purulent synovitis. No sequestrum was found and he recovered full range of movement. In March, 1921, he was admitted to hospital with pain in the right shoulder and a swelling in the right supraspinous fossa. A skiagram taken by Mr. Magnus Redding showed three cystic cavities, one expanding the base of the coracoid process and two in the neck of the scapula. These were exposed at operation and found to contain a jelly-like substance. They were curetted out and the cavities obliterated by removal of the superficial wall. A culture gave *Staphylococcus aureus* only and microscopical examination of scrapings showed a vascular type of granulation tissue.

Mr. Ogilvie's reasons for showing the case were, firstly, the contrast between the widespread periostitis, as seen in a radiogram taken by Dr. G. H. Stebbing four years ago and that of localised central abscesses in a second taken three weeks ago; and, secondly, the unusual site for a Brodie's abscess. Alexis Thompson in 1916 had collected 161 cases, of which 119 were in the tibia, the remainder being divided between the femur, humerus, radius, and ulna. No cases had been reported in the scapula. There was a good deal of confusion as to what was meant by Brodie's abscess. Many text-books mentioned central abscesses of bone only as a tuberculous condition. Some authors confined the term Brodie's abscess to a chronic central abscess of the tibia, while others included all abscesses of a similar pathology. Brodie's description was based on nine cases, all in the tibia; but he clearly recognised the condition as one not limited to any particular bone. It was surely better, if the term Brodie's abscess was to be retained, to include all chronic abscesses of bone septic in origin, in whatever bone they might occur. The point brought out by Thompson that Brodie's abscess is liable to follow mild attacks of infection rather than those in which an acute process has gone to sequestrum formation was well illustrated by this case. The process was acute in the tibia and femur and these bones now showed only periosteal thickening, while in the scapula a milder infection had resulted in the persistence of still living cocci in the interior of the bone and the appearance of central abscesses four years later.

Mr. A. W. SHEEN showed a case of

Abdominal Tumour

in a man aged 26. He had had malaria, sandfly fever, and dysentery during the war, and in August, 1920, when before a medical board for malaria, complained of a pain which had recently developed below his left ribs, and was recommended to hospital. The pain became worse, particularly after exertion.

In March, 1921, he was admitted to hospital, having continued at his work until the day he came in. He had become slightly thinner. He was seen to be a thin, apparently healthy man. In the left umbilical region was an abdominal tumour, the size of an orange, and reaching to the mid-line with its lower border at the transverse umbilical level. It was smooth, firm, slightly movable, and had a communicated aortic pulsation. It was slightly tender on pressure. An intermittent pain, worse after exertion, was referred to its region. A barium meal showed a normal alimentary tract, except that there was a bulge at the left end of the greater curvature of the stomach, not in the situation of the tumour. Early in April he was seen again. The tumour was difficult to make out clearly, there being only an indefinite tender fullness.

Among numerous diagnoses which had been made those which, to Mr. Sheen, appeared to be most probable were displaced kidney, tumour of stomach, cyst of tail of pancreas. He proposed to operate and report later. At the meeting the tumour was again quite distinct.

Dr. BERNARD MYERS showed

A Case for Diagnosis.

It was that of a girl, aged 13 years, who had attended hospital in February complaining of swelling of the stomach. She was found to be moderately developed and mentally to be up to the standard. A distinct yellow tinge of the conjunctivæ and skin was present, and apparently had existed since the age of 7. It was said to become a little worse when she caught cold. Telangiectases were noted on the cheeks and forehead. The spleen and liver were both increased in size, the former extending to one inch below the umbilicus, and its right border crossing the middle line of the body. It was moderately firm and not tender. The liver extended from the fourth rib in the right nipple line to three fingers-breadth below the costal margin. It seemed to be rather hard and what appeared to be little nodules were palpable on its anterior surface and lower border. One small area was a little tender. There was no ascites. The apex beat of the heart was in the fourth space in the nipple line and a reduplicated first sound was heard at the apex. At the apex of the right lung there were slight impairment, harsh breath sounds, and increased expiration and vocal resonance. Some moist sounds were audible over this area and most of the right front. The urine contained a trace of bile but was otherwise normal. The tongue was fissured. A few lymphatic glands could be felt in the neck and a doubtful one over the internal condyle of the right humerus. There was no history of a similar case in the family. The patient had apparently had no symptoms until she was 7 years old, but since then had never been quite well and had suffered from slight epistaxis. Banti's disease seemed to be negatived by the absence of hæmatemesis and ascites and by the leucocyte count. The leukæmias were excluded by the blood examination and the history. The case seemed possibly to be one of acholuric jaundice of the Hayem type. The fæces were coloured normally, the urine contained a distinct trace of bile, and initial hæmolysis occurred between 0·45 and 0·5 per cent. saline, with total hæmolysis by naked eye at 0·275 per cent. and by microscope at 0·2 per cent. It was necessary therefore to look elsewhere for the diagnosis. The history in some ways was like that of Hanot's cirrhosis, but not altogether, nor was the liver typical of that complaint. The first Wassermann reaction was negative, a second by another pathologist two weeks later doubly positive, and a third by a different pathologist was negative. It was decided, however, to give glucose-galyl, 0·02 g. intramuscularly every fortnight, and also intramuscular injections of ½ gr. of mercury in cream form, and hyd. c. cret. gr. 1, with pot. iodid. gr. 4 were administered three times a day. After a month's treatment the spleen had become a little softer and slightly smaller. The liver was a finger's-breadth less than formerly. The icteric tinge had diminished a little, and she stated that she felt better generally than she had done for some years.

Mr. B. S. SIMMONDS showed a case of

Gunshot Wound of the Right Arm,

with fracture of the humerus and lesion of the musculospiral nerve.

The patient had been wounded in February, 1918; the wound healed in June, 1918, but had broken down twice afterwards. In January, 1919, exploration of the musculospiral nerve revealed a gap in its continuity of four inches, and it was found impossible to bring the ends together. In May, 1919, tendon transplantation was performed with success, the pronator radii teres being transplanted into the

extensores carpi radiales longior and brevior, the palmaris longus into the extensor ossis metacarpi and primi inter nodii pollicis, the flexor carpi radialis into the extensor communis digitorum and the flexor carpi ulnaris into the extensor secundi internodii pollicis and extensor indicis. The after-treatment consisted of splinting the wrist with the thumb and fingers in hyperextension, and in re-education.

Mr. SIMMONDS also showed a case of

Gunshot Wound of the Left Shoulder and Chest,

which had been accompanied by fracture of the left clavicle and first rib, lesion of the brachial plexus, lesion of the axillary artery and vein, and hæmothorax.

The patient, a man, aged 22, was wounded in October, 1918, his wound being healed in March, 1919. Examination in May, 1919, revealed a complete lesion of the brachial plexus. In June of that year the plexus was explored by division of the clavicle and of the pectoral muscles. The fifth, sixth, seventh, and eighth cervical and first dorsal roots were found to enter a dense mass of scar from which the cords of the plexus emerged. Faradic stimulation of the roots gave no result and the scar tissue, including the plexus, was excised. Nerve suture was performed as follows: the fifth cervical to the posterior cord, the sixth cervical to the outer cord, and the seventh cervical to the inner cord. The clavicle and pectorals were then sutured. When seen in October, 1920, weak voluntary contraction had reappeared in the biceps and weaker in the deltoid. A faradic response was obtained in all the muscles and there were evidences of regeneration of sensation. Examination in January, 1921, showed voluntary contraction in the deltoid, biceps, triceps, supinator longus, extensor carpi radialis longior, and extensor carpi radialis brevior.

SECTION OF SURGERY: SUBSECTION OF ORTHOPÆDICS.

EXHIBITION OF CLINICAL CASES.

A MEETING of this section of the Royal Society of Medicine was held on April 5th, Mr. E. LAMING EVANS, the President, being in the chair. Among the cases shown and reported were the following:—

Mr. A. H. TODD showed a case of

Chronic Arthritis of the Knee

in a syphilitic boy aged 9 years. He was one of four children, three of whom were living. There were no miscarriages.

He first attended hospital in June, 1918, complaining of "pains all over," on and off, for a month, and that at the beginning of the attack his skin had come out in blotches. His deep reflexes were normal and his nutrition was good. The knee contained no fluid, it was not tender, and his temperature was normal. The diagnosis then made was tuberculosis of the right knee-joint, with erythema nodosum, and fading secondary nodules on the legs and arms. The Wassermann reaction was positive. He continued to limp till December, when he had pains in the hips and ankles, and then pain and swelling of the right knee, lasting for over three weeks; his heart was found to be normal. He was admitted with a diagnosis of ? rheumatism, but the pain, fluid, and swelling persisted in spite of rest and salicylate treatment. In February, 1919, a splint was applied, and a week later the movements were described as "fairly free and painless," but there was much more peri-articular thickening. Pot. iodid. was now administered for the first time, and was continued for more than a year. In March, 1919, the Wassermann reaction was still positive. The condition fluctuated in severity till June, by which time (the limb being in plaster) the pain had subsided somewhat. The Wassermann reaction was now negative. In August, 1919, he was admitted to hospital, and a calliper splint was applied instead of the plaster, and between then and now he had been readmitted several times to have the knee straightened.

At the present time the knee was still puffy, especially on the inner side above the patella; the thigh was one inch wasted, there was tenderness on moving the patella laterally across the femur, and flexion was much limited. The Wassermann reaction was negative. The teeth and eyes were normal and the patient showed no signs of congenital syphilis, except that he was somewhat deaf; the aurist could find no lesion of his auditory nerve. The skiagrams showed marked rarefaction of the bones of the right knee-joint, together with considerable erosion of the articular cartilages and the surface of the underlying bone. The appearances were very like those seen in tuberculous disease of the knee-joint, but the destruction of the articular surfaces was rather greater than would be expected in a knee that showed so little evidence of activity at the present time.

The main interest of the case lay in the question of whether the condition was one of true syphilitic arthritis or one of tuberculous disease in a syphilitic child. Mr. Todd said that when he was an out-patient officer at Guy's Hospital he had Wassermann tests made as a routine upon all patients who had any sort of chronic arthritis; some of them proved to be positive, and of these particular cases some presented close analogies to tuberculosis, whilst others looked like rheumatoid arthritis or even osteoarthritis. While he was careful not to assume that a positive blood test meant that the disease present was actually caused by syphilis he gave salvarsan to all those who had positive reactions, and some of them not only got well rapidly but remained permanently well. That opened his eyes to the fact that numerous cases diagnosed as tuberculous or other chronic arthritis were really and truly syphilitic, and he advocated the examination of all patients who had chronic arthritis of any sort by the Wassermann test as part of the routine examination. It had been suggested that syphilitic persons were more liable than normal persons to tuberculous infection. That seemed to him to be a confusion of thought, and we could draw an analogy from other groups of known syphilitic cases; children with syphilitic keratitis were certainly syphilitic, yet their general health was often very good, and he did not remember ever having seen one of them with a tuberculous joint. In his experience syphilitic joints rapidly got well under vigorous antisyphilitic treatment if they were diagnosed early, and they healed very slowly or not at all if antisyphilitic remedies were only used late in the case. In the case shown it might be argued that the persistence of pain, swelling, and limitation of movement after so much treatment were in favour of tuberculous disease. On the other hand, the left knee seemed to him to be not quite normal; the posterior surface of the patella in the radiogram showed a distinctly crenated and rather fuzzy appearance, which was different from the very clear and definite outline of the normal bone at this age. If that indicated that the left knee was also involved it would be a strong point in favour of syphilitic arthritis, and would make a diagnosis of tuberculosis much less probable.

Dr. W. T. GORDON PUGH said that cases of congenital syphilis were not infrequently admitted to Queen Mary's Hospital, Carshalton, as tuberculosis, especially cases with glands of the neck. With regard to joint affections, in syphilis of the knee the condition was generally symmetrical and cleared up after administration of kharsivan.

Tuberculous Dactylitis.

Mr. P. MAYNARD HEATH showed a case of Tuberculous Dactylitis in an unmarried woman aged 31.

Her illness began ten years ago with enlarged glands in the neck. She was taken to hospital and was said to have enlarged glands all over her body. Seven years ago the right thumb became painful, and swelling followed in two or three days. The pain ceased after two months. Gradually all the fingers became affected. A gland in the neck was aspirated four years ago, and this was followed by the appearance of lupus on the face and neck. She had been treated for ulceration of the cornea five years ago, and had suffered from winter cough since the age of 7. There had been an attack of hæmoptysis at Christmas, 1920, and on four occasions since. There was no definite history of tuberculosis in the family except that the mother's sister had two daughters suffering from phthisis. At the present time the hands were extensively crippled by firm swellings, apparently involving the tendon sheaths of all the digits. Considerable deformity was produced and the movements of the fingers and thumbs were limited. The glands on both sides of the neck were enlarged and there were patches of lupus on the face and neck. There were signs of phthisis in the upper lobe of the right lung.

X ray examination of the hands showed discrete areas of rarefaction scattered through all the bones. There was no new bone formation. X ray pictures of the feet showed a similar condition, though clinically the feet were unaffected. No changes had been detected in the long bones. The Wassermann reaction was negative. The hands had been treated by Bier's passive congestion, the application of dry heat, and the inunction of colloidol iodine oil. Very slight amelioration had been produced.

Finger Injury.

Mr. A. W. SHEEN described the case of a woman aged 49, who, in December, 1920, fell and dislocated her left ring finger at the proximal inter-phalangeal joint, the finger being bent to the ulnar side. She pulled it in herself. Subsequent treatment was by massage and movements, and later by strapping of the joint. The pain and swelling which were present became less, but did not disappear. X ray examination in February, 1921, showed a chip fracture of the distal end of the proximal phalanx on the ulnar side. She was now being treated by massage, hot air, and ionisation, and, as an inability to extend the finger completely had developed, a small splint was worn to pull the finger into full extension. Swelling was still present, pain was slight and intermittent, and active movements were good. Sagittal and lateral skiagrams were shown.

The PRESIDENT showed a case of

Bilateral Radio-Ulnar Synostosis

associated with Bilateral Congenital Dislocation of Hips in a girl aged 5, who was first seen in May, 1918. The mother complained that the child was unable to roll the forearms. The patient had three sisters and one brother without deformity, and there was no history of deformity in the family. A synostosis of the upper ends of the radius and ulna were present on both sides, the forearms being in position of pronation. In the routine examination of the child for other deformities it was found that a bilateral congenital dislocation of the hips was present. These were reduced in September, 1918, and a radiogram was shown before reduction and one taken in February, 1921, which confirmed the physical findings that the treatment had been successful. He had not attempted to treat the radio-ulnar synostosis because (1) the functional disability was slight and could be compensated to a large extent by external rotation of the shoulder, and (2) attempts at nearthrosis had resulted, in the cases he had seen, in failure.

Mr. D. MCCRAE AITKEN reported that he had recently had a case of synostosis of the radius and ulna in a girl of 13, otherwise well developed and intelligent.

The synostosis involved the superior radio-ulnar joint and extended nearly to the bicipital tuberosity. An operation was performed on the left arm, when an incision was made along the posterior border of the ulna, the anconeus separated from its insertion to the back of the olecranon, and the whole block of bone between the radius and ulna removed, including a considerable portion of the adjacent parts of both bones. When taking out this block of bone the portion of muscle attached to the coronoid processes was pulled right through to the back. This was secured to the edge of the anconeus, and when released pulled the anconeus as a complete buffer between the two. Free rotation was possible at the time. The operation was performed three days ago, and Mr. Aitken said that he would report the result in six months' time.

The PRESIDENT also showed a case of

Multiple Cartilaginous Exostoses,

associated with congenital dislocation of hip in a girl aged 9, who was first seen at age of 2 years and 9 months in October, 1914.

The left leg was noticed to be shorter than the right, and examination showed a dislocation of the left femur on to the dorsum ilii. Nothing abnormal could be detected either on the femoral head or at the site of the acetabulum. A thickened mass could be felt on the anterior surface of the left femur below the level of the great trochanter and a small irregular mass on the crest of the right ilium. It was noted at the time that these masses were of the nature of cartilaginous exostoses. The child was not seen again until March, 1921, when the case had then developed into a typical one of multiple cartilaginous exostoses. There was no history of deformity in either the father's or mother's family. One sister and two brothers were normal. Exostoses could be felt on the left femur at the insertion of the adductor magnus, and at its upper end on its anterior surface just below the level of the great trochanter, on the left tibia at the insertion of the sartorius, and at the lower end of the left fibula. The X ray appearance of the left acetabulum strongly suggested a cartilaginous exostosis arising from the Y-shaped cartilage, but this could not be confirmed by palpation. Exostoses were also present on the right iliac crest, right femur, and right fibula, the lower end of the right radius, and the vertebral borders of the scapulæ.

The PRESIDENT considered that this was a case of so-called congenital dislocation of the hip in which the cause had been a shallowing of the acetabular floor caused by a cartilaginous exostosis arising from the Y-shaped cartilage, and projecting above the level of the floor of the acetabulum.

ROYAL MEDICO-CHIRURGICAL SOCIETY OF GLASGOW.

A MEETING of this society was held in the Faculty Hall on March 18th, Professor WALTER K. HUNTER, the President, in the chair.

Mr. J. MILL RENTON made a communication on

The Surgical Treatment of Chronic Sciatica.

He thought that the benefits of surgical treatment were not widely recognised, possibly on account of a lack of appreciation of the type of case suitable for operation, and also possibly because nerve stretching is an unsatisfactory operation. He advocated, in suitable cases, nerve freeing. To ensure success the diagnosis must be correct and non-inflammatory causes of sciatic pain ruled out before the operation is undertaken of nerve-freeing. Mr. Renton divided cases of chronic sciatica into three groups :—

1. Cases where the patient is quite free from pain while at rest but begins to have pain on exercise or on assuming some special position.
2. Cases where there is a certain amount of pain during rest, which becomes really intense on exercise or on the assumption of a particular position.
3. Cases where the pain is indefinite, present at rest off and on, and sometimes improving to a certain extent on exercise.

In the first type of case the inflammation has subsided and left adhesions and even bands of adhesions which drag on the nerve. This type of case is pre-eminently suited for nerve-freeing. In the second type of case there is presumably also some degree of inflammation of the nerve still present, which is possibly kept up by the pull of the adhesions. In a majority of cases operation benefits these cases but not in all. In the third type of case the pathology is not clear and operation does not seem to benefit the condition. The operation consists in exposing the nerve and removing all adhesions from the sacro-sciatic notch to the middle of the thigh. A certain amount of stretching of the nerve is unavoidable, but the principal part of the treatment is the separation of the adhesions.

Injury of the Thoracic Duct.

Mr. G. H. EDINGTON read a short account of two cases in which the thoracic duct was injured in the operation for removal of tuberculous cervical glands.

Early in 1911 he operated on a boy, aged 7, for tuberculous cervical glands involving an extensive dissection on the left side of the neck. The thoracic duct was not seen and there was nothing unusual in the wound at the conclusion of the operation. There was post-operative rise of temperature to over 100° F., and in 36 hours the dressings began to be soaked with watery discharge. On the fourth day the wound was opened and fluid sponged out; the welling of fluid had ceased, but the jugular vein was found to be very fragile. There was no pus in the wound and the muscles were peculiarly clean and bare. Death took place on the night of the sixth day with a copious flow of blood from the wound.

On the second case, a woman aged 28, Mr. Edington had operated in the summer of 1920. Extensive dissection on the left side of the neck was required, but the thoracic duct was not identified. The following day there was copious watery discharge, and two days later there was ballooning of the lower part of the neck, and through the lower incision there spouted fluid like whey, of a pale-greenish colour. The temperature rose to 101°, and, as milky fluid continued to pour out, the cavity in the posterior triangle was packed with gauze. The tissues in this case also were macerated. After the firm packing of the posterior triangle the milky discharge became gradually less, and the wound healed without further event.

In the discussion Mr. ARCHIBALD YOUNG recorded a third case of a man, aged 52, whom he operated on in 1910 for a very extensive tuberculous involvement of the cervical gland on the left side.

Dissection of the glands was carried out laboriously and with much difficulty, and the sterno-mastoid muscle, part of the parotid gland, and part of the internal jugular vein were removed in the course of the operation. During the operation Mr. Young became aware, through soaking of his gown and the sheets on the operating table with a glairy, sticky fluid, that injury of the thoracic duct had taken place. An attempt was made to find the injured duct but without success, and in the end recourse was had to packing with iodoform gauze. From the time of the operation there was no further escape of chyle, and on the removal of the packing, which was not disturbed for several days, it was found to be soaked with serum only. Recovery was uneventful.

Mr. J. HOGARTH PRINGLE, Dr. L. T. STEWART, and Professor J. H. TEACHER made a communication on

Digestion of the Œsophagus as a Cause of Post-operative and Other Forms of Hæmatemesis.

The main points in the paper, which was illustrated by specimens, sections, and lantern slides, were as follows:—

Post-operative hæmatemesis is a symptom of great importance to the practical surgeon and associated with serious danger to the patient. In recorded cases various explanations are given, but digestion of the œsophagus is not mentioned. A few cases of intra-vitam œsophagomalacia and ulcus a digestione have been recorded, and in July, 1914, Glynn demonstrated to the Pathological Society of Great Britain and Ireland, sections of the œsophagus which showed ulceration and inflammatory reaction. Prior to January, 1914, one of us had seen two cases of destruction of the lower part of the œsophagus which looked as if it might have commenced during life. Then a case occurred under Mr. Pringle in which vomiting of brown material was observed after operation and about 36 hours ante mortem. There was also complaint of pain behind the sternum. No cause of these except the digestion of the œsophagus (which had not gone the length of perforation) could be made out and the observation then ceased to be a pathological curiosity and became a matter of practical importance. In 1919 the authors made a communication to the *British Journal of Surgery* (Vol. VI., No. 24, p. 523) on this subject. In that article they described a number of cases in which digestion of the œsophagus appeared to have been the cause of hæmatemesis or vomiting of brown or black material, and in some cases the cause of death. Several of the cases in the series were not surgical but medical cases—e.g., anthrax, pneumonia, and puerperal eclampsia. On clinical and morbid anatomical grounds the digestion of the œsophagus was regarded as a vital phenomenon. Sections from a number of these cases were shown to the Pathological Society at the meeting in Leeds in January, 1921, and full publication will be made in the *Journal of Pathology and Bacteriology*. A short abstract of the communication appears in the *Journal* (Vol. XXIV., 1921, pp. 119-120), in the Proceedings of the society.

Intra-vitam digestion of the œsophagus is supposed to arise in the following manner. Vomiting of active gastric juice occurs, but the œsophagus fails to clear itself and some of the fluid remains in it, accumulating particularly just above the cardiac sphincter, in which region the injury to the tube is usually most advanced. In post-operative hæmatemesis the fluid ejected is usually extremely acid, and those patients who are sufficiently conscious to be able to express themselves frequently complain of the scalding effect which it has upon the throat and lips. The lesions produced ante mortem by gastric juice which has escaped into and lain in the œsophagus are apt to be more or less obliterated by changes due to continuation of the digestion post mortem. In 12 of the 15 cases which were described in 1919, and 4 new ones, however, microscopic examination has revealed unmistakable signs of vital reaction in the form of abundant leucocytic infiltration of the mucous membrane and other tissues, congestion of blood-vessels, accumulation of leucocytes in the vessels, thrombosis, and inflammatory œdema. The picture is that of an acute ulceration. It is easier to recognise these changes than to assess the extent to which they may have been obscured or obliterated by continuation of digestion, or to decide the relative amounts in which that digestion is a continuation of the lesion which developed during life or a post-mortem change. Probably these cases have been observed, but the lesions have been put down as merely post-mortem digestion, from which, however, we do not now find it difficult to distinguish them. It is therefore clear that digestion of the œsophagus during life does occur, that it may be the cause of death, that it occurs in other than operation cases, and that it may be arrested and healing take place. Its occurrence is shown by hæmatemesis, and in some cases by pain behind the sternum. It is therefore open to diagnosis, and must, in some cases at any rate, be amenable to treatment. The commencement of healing has been recognised in two specimens.

In most of the cases recorded in the *Journal of Surgery* the digestion probably began not more than 36 hours before the death of the patient; in some cases the duration was much less, reckoning from the occurrence of the hæmatemesis. The morbid anatomy of the cases showed great variation, from slight condition in which the phenomena were superficial erosion of the mucous membrane with hæmorrhages into the affected tissue and black fluid in the œsophagus to cases in which perforation or extreme maceration of the lower third of the œsophagus and extensive digestion of the adjacent surfaces of the lungs had taken place. Nine examples of the most advanced type, five severe but not perforated, and five slighter lesions have been observed—17 of them since January, 1914.

A most important diagnostic feature available at post-mortem examination is the relatively slight change in the stomach, which may show only slight post-mortem digestion or a total absence of that condition, contrasting with advanced digestion of the œsophagus immediately above the cardiac ring. In most cases, at least of the severer types, there is a well-marked zone of deep ulceration immediately above the cardiac ring. At a varying distance above this the changes are less of the nature of destruction, the predominant features being superficial erosion and hæmorrhages into the mucous membrane, such as are seen in the slight cases. Signs of reaction may be unrecognisable or very slight in the lower parts, but well marked in sections prepared from the upper parts of the damaged œsophagus.

Mr. G. H. EDINGTON and Dr. A. S. STRACHAN showed a card specimen of a Pendulous Fibroma of the Labium Majus suggesting at first sight pseudo-hermaphrodism, taken from an aged female subject in the dissecting-room. A microscopic section of the tumour was also shown.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.

Exhibition of Cases and Specimens.

A CLINICAL meeting of this society was held at the West London Hospital on April 1st, Dr. F. J. MCCANN, the President, in the chair.

Mr. ASLETT BALDWIN showed a case of Recurrent Dislocation of the Hip in a girl of 17, the subject of old-standing poliomyelitis affecting the whole lower limb. Recurrence of the dislocation had not taken place since the hip had been placed in plaster after reduction in the abducted position four years ago. Since the final reduction the limb had developed considerably.

Mr. B. SANGSTER SIMMONDS showed: (1) A case of Persistent Headache and Recurring Fits, following gunshot wound of the parietal bone. The case had been treated by Sergeant's method of inserting celluloid plates, after the brain had been released from its adhesion to the scalp. Since operation headache and fits had ceased completely. (2) A case of Gunshot Wound of the Knee in which an arterio-venous aneurysm of the popliteal vessels had been successfully removed. (3) A man in whom a Largely Functional Ataxia had followed a temporary organic paralysis. (4) A case of Functional External Popliteal Nerve Paralysis following a gunshot wound of the thigh.

Mr. NEIL SINCLAIR showed radiograms of an Ossifying Ecchondroma of the Upper End of the Humerus in a boy of 9. The tumour was solitary.

Dr. W. N. GOLDSMIDT showed: (1) A case of Friedreich's Ataxia in a girl of 17. No other member of the family was affected. (2) A boy of 15 with Congenital Syphilitic Liver and Spleen. Tumours were present in the liver and spleen, and there was a positive W.R.

Dr. CLIFFORD ELLINGWORTH showed a case of Myelocythæmia in a woman. Attention had been directed to the large spleen when the patient was under treatment for excessive bleeding following a miscarriage. The blood changes were typical.

Dr. W. R. MARSHALL showed: (1) A case of Pernicious Anæmia improving under treatment with neoarsenobillon injections. (2) A case of Colitis in a woman. Full investigation of the cause of the condition had not been completed yet.

A discussion on the Diagnosis and Treatment of Colitis followed, in which the PRESIDENT, Drs. A. BALDWIN, H. W. CHAMBERS, VAUGHAN PENDRED, RICKARD LLOYD, W. N. GOLDSMIDT, S. D. CLIPPINGDALE, and D. G. RICE-OXLEY took part. The importance of sigmoidoscopic examination was referred to. The influence of diet as a cause and in the treatment of the condition was emphasised. Bacteriological examination of the fæces and treatment by vaccines was part of the routine treatment. The influence of climate was also commented on by several members.

Reviews and Notices of Books.

ORTHOPÆDIC SURGERY OF INJURIES.

By Various Authors. Edited by Sir ROBERT JONES, K.B.E., C.B., F.R.C.S., Director of Orthopædics, St. Thomas's Hospital; Honorary Adviser to the Ministry of Pensions (Orthopædic Surgery). London: Henry Frowde and Hodder and Stoughton. 1921. In two volumes. Vol. I., pp. 540; Vol. II., pp. 692. £4 4s.

THESE two handsome volumes embody the principles and practice of the British orthopædic centres and special surgical hospitals in and after the Great War. To their editor belong the honour and credit of having organised and directed this great work, with which he was entrusted by Sir Alfred Keogh, who selected a man pre-eminently qualified to inspire all under him with his energy and enthusiasm. It would be a calamity if the knowledge acquired in the practice of war orthopædics, which is largely applicable to the treatment of the injuries of peace, were lost for want of an adequate record, and it would have been discreditable to British surgery if such a work as the "Traité de Chirurgie Reparatrice et Orthopédique" were to have no counterpart in this country.

Sir Robert Jones gives an interesting account of the genesis of the special hospitals, and of their increase from 250 to nearly 30,000 beds as the need for specially skilled treatment increased. He emphasises the immense superiority of voluntary over passive movement, and he rightly asserts the necessity of a thorough knowledge of general surgery in the surgeon who would succeed in orthopædic work.

The article by Professor Arthur Keith on the Principles and Practice of Hugh Owen Thomas amounts to a dedication of these volumes to the memory of that brilliantly original surgeon, who was so little appreciated by his contemporaries, and whose inventions have probably been the means of saving the lives or limbs of thousands of wounded soldiers. Sir H. M. W. Gray brings this out clearly in his article on the prevention of deformities, in which he deals with first-aid, the transport of the wounded, and treatment in casualty clearing stations. In one army alone, after the use of the Thomas splint had been demonstrated in all the field ambulances, the mortality from fractured femur was reduced from 50 to 15·6 per cent., and in this series the proportion of amputations was only 17·2 per cent.

Colonel Goldthwait, who was senior consultant in orthopædic surgery to the United States Expeditionary Force, also recommends the Thomas splints in the first treatment of wounds and sets forth his well-known views as to the importance of posture and of weak or flat feet.

The treatment of simple fractures in our civil hospitals had fallen into a bad way. The brilliant advance of abdominal surgery so dazzled the eyes of surgeons and students that they could not see the great importance of adequate knowledge and experience of the treatment of fractures of the limbs. Fractures of the lower extremity were either not admitted to the wards or when admitted were treated as beneath the notice of visiting surgeons.

The article by Mr. W. H. Trethowan on simple fractures deals duly with principles as well as details and should prove useful and suggestive to all who would adequately treat these injuries. The uses of central and external bone grafts and of plates are well considered, the latter being preferable only when great strain has to be borne during the process of union. A valuable hint is given as to fractures of the toes: "a minor fracture may give a major disability." In no department of surgery have greater advances been made than in the splinting of war fractures, and this is treated by Dr. Henry G. Carlisle in a chapter well illustrated with photographs.

Mr. W. Hey Groves was well known before the war for his original methods of treating fractures, and the article on ununited fractures is safe in his competent hands. The details and the good results of the bold and ingenious procedures adopted by him are well shown in his diagrams and radiographs. The editor himself deals very briefly with the subject of mal-union of the femur and the procedures necessary for its correction; he never uses plates. Chronic osteomyelitis and the persistent sinuses and suppuration which have been so troublesome to surgeons and patients are dealt with by Mr. R. C. Elmslie succinctly and clearly.

Mr. Naughton Dunn and Mr. S. W. Daw describe the treatment of disabilities of joints of the upper extremity above the wrist, showing the good results of their treatment. Dr. Walter Baldwin, of San Francisco, deals with the hand and wrist, and points out how all important is function in this region, where, as he says, no criterion other than function can be of the slightest interest to the patient applying for relief. We suggest, however, that appearances are often given great importance by the patient. Since stiff joints of the fingers and hand are, unfortunately, common as the result of war injuries and are equally disabling and resistant to treatment, the recommendations of Dr. Baldwin are sure to arouse interest. The ingenious splints employed by him are well shown in the illustrations.

Dr. F. C. Kidner, late consultant to the United States Expeditionary Forces, gives a brief account of disturbances of the lumbar spine and pelvic girdle. These conditions have not received so much attention here as in America, and the ætiological relation between some cases of sciatica and subluxations of the pelvic joints is not generally recognised. The subject deserves more study in this country. An excellent article on the knee-joint, contributed by Mr. Alwyn Smith, deals with injury and with secondary conditions such as arthritis.

In an important article on ankylosis and stiff joints, Sir Robert Jones confines his remarks to the later treatment to which joints injured in the war must be subjected. As regards early treatment, he insists on the supreme importance of the principle of relaxation of damaged structures such as ligaments, of far more importance at an early stage than any form of physiotherapy. His advice on the breaking down of periarticular and articular lesions is clearly set forth and of peculiar value. For the successful treatment of the conditions found in stiff joints great experience and sound judgment are required; Sir Robert Jones places his own unreservedly at the disposal of the reader. His article on the treatment of flail joints also is full of practical wisdom and instruction.

Mr. Elmslie writes briefly on amputation and artificial limbs, and the conclusions to which he comes will be approved by surgeons familiar with these subjects. Sir John Lynn Thomas describes the limb-fitting centre at Cardiff.

The second volume is devoted to injuries of the nervous system and their treatment, to so-called purely functional disabilities and their treatment, and to physiotherapy, &c. This volume is surely unique in surgical literature, in that it contains an article by a lately reigning monarch. Ex-King Manuel of Portugal contributes an article upon curative workshops, a subject that he made peculiarly his own at Shepherd's Bush, where he did so much to help forward the work of rehabilitation of the disabled. The subjects here dealt with are not so completely surgical as those of the first volume, some of them being written by physicians, but they are all subjects which may not be neglected by orthopædic surgeons.

The anatomy of the spinal nerves is well treated in the article by the late Professor A. Melville Patterson, the diagnosis of their injuries by Dr. Grainger Stewart and Mr. Rowley Bristow, the prognosis by Dr. Farquhar Buzzard, operative treatment by Sir Harold Stiles, post-operative treatment by Mr. Rowley Bristow, and end results by Mr. Beresford Alexander, some of whose conclusions have already been published in the *British Medical Journal*. An analysis of 500 cases of peripheral nerve lesions which passed through Alder Hey Hospital, and could afterwards be traced, showed as a result 35 to 44 per cent. of recoveries. The same subject is treated by Dr. Maud F. Forrester Brown, who studied the results obtained at the Edinburgh War Hospital at Bangour. Failing recovery after nerve suture, &c., tendon-transplantation and tendon-fixation have given most gratifying functional results, especially in musculo-spiral nerve lesions. This subject is well presented to us by Mr. T. P. McMurray. Dr. Buzzard and Mr. Percy Sargent write of injuries of the head and spine. These articles are, as might be expected, accurate and informing. An interesting chapter by Dr. J. le F. Burrow and Dr. W. Cuthbert Morton deals with functional and reflex disabilities and their cure. In the experience of the writers hysteria uncomplicated by wound or other injury was rare among soldiers.

In the course of the treatment of the many nerve lesions of the war anomalous and puzzling voluntary movements have sometimes been noticed, when the muscles which normally produce these movements are completely paralysed. The Croonian lectures on muscular movements by the late Dr. C. E. Beevor did not receive the notice and appreciation they deserved, and it is gratifying to find that a somewhat similar study has been undertaken by Professor F. Wood Jones, D.Sc., who has had the great advantage over Dr. Beevor of being able to test the muscles electrically when they are exposed on the operating table. He shows

how many and how remote the muscles may be that are pressed into service in attempting to perform a movement, when the proper muscles are paralysed, and what caution is necessary before we assume that, for example, because the patient is able to flex the elbow the musculo-cutaneous nerve is not completely divided. "No man can flex his wrist with his platysma, but ..... many men will attempt it." The photographs reproduced in this chapter are most illuminating. The ancillary but most important subjects of splints and plaster are adequately treated by Mr. McCrae Aitken, plain metal splints by Mr. Lane Joynt, the electrical department by Mr. Rowley Bristow, massage by Dr. J. B. Mennell, the Ling system by Dr. Murray Levick, hydrotherapy by Dr. Fortescue Fox, while orthopædic X ray work has been entrusted to the competent hands of Mr. Thurstan Holland, who records the startling fact that there are some 250 methods of locating foreign bodies. The comparatively simple method described by Mr. Holland has given good results and stood a long test. The double exposure method both with screen and plate has been shown to be thoroughly sound and useful, although in unaccustomed hands it may not be so immediately convincing as the stereoscopic method, which is also described. Dr. Holland's work in his specialty is so well known that it is hardly necessary to state that his contribution to this volume is of great value.

Dr. Walter de M. Hill's article, although the last in the book, is not the least informing. He gives an account of the organisation and equipment of a special military (orthopædic) hospital of 1000 beds, which is interesting as a record and as a guide to future possibilities.

As the editor admits in his preface, it is very difficult to define orthopædic surgery. No operations or appliances can be differentiated as peculiar to orthopædics, but there is an attitude of mind which is definitely orthopædic and which sets forth the restoration of function as the end and aim of treatment. Operating surgeons have been too apt to consider their work done when the operation wound is healed. The orthopædic surgeon considers that his task is often scarcely begun at that stage, although much preoperative work may be necessary; operations may be only minor events in the course of successful treatment.

PHENOMENA OF MATERIALIZATION.

A Contribution to the Investigation of Mediumistic Teleplastics. By Baron VON SCHRENCK NOTZING, Practising Physician in Munich. Translated by E. E. FOURNIER D'ALBE, D.Sc. Lond. and Birm. London: Kegan Paul, Trench, Trübner, and Co., Ltd.; New York: E. P. Dutton and Co. 1920. Pp. 340. 35*s*.

THIS is a monograph of considerable size and profusely illustrated dealing with the particular phase of mediumship usually called materialisation and termed by the author "mediumistic teleplastics." From the preface to the first German edition, which appeared a year before the war, we gather that Baron von Schrenck Notzing has been earnestly engaged for some time in spiritualistic inquiry, while photographs are published, in evidence of the occurrences related, dating from as far back as 1909. Detailed observations over the same period of time are contributed by a lady who acted as protectress to the medium through whom the more important manifestations were apparently obtained. We have no reason to doubt the complete sincerity of Baron von Schrenck Notzing, but we cannot think that scientific readers will find his work in the least convincing. "Nothing is too wonderful to be true," said Faraday, and quotes the author, but whether the occurrences which are recorded in this work are capable of explanation in accordance with known physical lines or not, it is not a scientific attitude to postulate explanation of any transcendental sort, while simpler explanations can be put forward. This is not to say that we are capable of explaining away all the things that have been said to happen or to comprehend the mechanism by which the photographic appearances may have been obtained, but it is perfectly clear that neither the statements nor the pictures have been subjected to anything like the scrutiny which the pièces d'évidence in an ordinary scientific experiment are bound to undergo.

In a large proportion of the manifestations the medium was one called Eva C——, who seems to have been engaged from youth at séances, and to have lived during a large proportion of the time dealt with in this book under the care of a Mme. Bisson, who was usually present at the conduct of the séances. Why, one must ask in face of the claim of the observation of scientific precautions, was such an obvious opportunity for collusion allowed to continue? It is impossible not to regard the minute safeguards, stated by the translator to be "excessively severe to eliminate the hypothesis of fraud," as a little comical when so excellent a chance for fraud was permitted to go unchallenged. Appeals to the spotless honour of the medium and of Mme. Bisson have nothing to do with the case, the moment the claim is made that scientific precautions have been taken.

We doubt whether this work, imposing though it is in appearance and solemn in claim, will do much to remove scepticism; further, we can even conceive its shaking the faith of those who are already believers in occurrences of "materialisation."

LES CARDIO-RENAUX.

Étude théoretique et pratique. Par O. JOSUÉ et MAURICE PARTURIER. Paris: E. Le François. 1921. Pp. 230. Fr.12.

THE problems presented by cardio-renal cases are among the most difficult in both clinical medicine and pathology. In the more obviously cardiac cases with signs and symptoms of heart failure it is a matter of considerable difficulty to determine how far failure of renal function is a complicating factor in the case. And even when a part of the clinical picture is obviously the result of renal inadequacy the clinician is faced with the further difficulty of differentiating between a condition of primary renal inadequacy and one merely secondary to vascular stasis. Genuine renal cases present a similar problem, for in these the difficulty turns on the estimation as to how far an accompanying and relative degree of heart failure is an aggravating factor in the case. It is with these obscure problems that this book concerns itself, and thus fills an important gap in medical literature. The authors take a simple view of their subject and make an important distinction between true and false cardio-renal cases, based on the determination of renal adequacy after cardiac efficiency is restored. The group of "true" cardio-renal cases includes those only in which signs of renal inadequacy persist after cardiac efficiency has been re-established. The authors have been occupied for many years in the investigation of renal efficiency in cardiac and cardio-renal cases, and they have simultaneously made a close clinical study and analysis of their cases. Their results are here collated and presented with originality of thought, clearness of expression, and disregard of many time-honoured conceptions of cardio-renal disease. They discuss the chemico-physical theories of œdema and renal excretion in so far as they are necessary for a proper clinical understanding of the subject, and at the same time their work has an immediate practical interest since it establishes principles on which treatment should be based. Ample references to the current French literature are given. It is interesting to find that this book reflects the present trend of thought in regarding renal disease as cardio-vasculo-renal, a conception that gains less ready acceptance in England, where the classical observations of the late Dr. Richard Bright tend to maintain their dominating influence.

A FIRST COURSE IN GENERAL SCIENCE.

By FREDERIC DELOS BARBER, Professor of Physics, Illinois State Normal University, and Others. London: G. Bell and Sons; New York: Henry Holt and Co. 1921. Pp. 608. 9*s*.

A MASTER at a well-known school who had a mind which soared beyond questions of grammar, syntax, and prosody, used to set a paper entitled "A Common Sense Paper," in which the scholars were asked such questions as "Why does the barometer go up and down?" "How does a pump work?" "Why do chimneys smoke?" "What is the difference between

the working of a gas light, an oil lamp, and a candle?" and so on. The book now before us supplies the answers to all these questions, and to a great many similar, and is altogether a most useful and informing work. It deals with such matters as the production and use of light and heat, refrigeration and its uses, the weather and the seasons, ventilation, food, micro-organisms, soil, water-supply, machines, work, energy, and applied physics generally.

In the matter of lighting surely the authors are incorrect when they say (p. 6) that "up to about 1860 candles were by far the safest and best sources of artificial light which the world had ever used." The moderator lamps of our fathers' and grandfathers' time, burning colza oil, were perfectly safe, and if properly looked after gave a very good light. The statement above quoted is all the more remarkable, as the authors tell us on p. 101 that coal gas was used for street lighting in Baltimore so long ago as 1817. In the sections on machines, it seems to us that the statement in par. 648 needs making clearer. "A locomotive owes its power to pull a train to the friction between its drive wheels and the rails. The largest locomotive ever built weighs 336 tons and can exert a pulling force of about 60 tons and can easily pull a train of 200 cars, each weighing 50 tons. If this locomotive were attached to a train requiring a force of more than 60 tons to move it, the locomotive would be unable to start the train because its drive wheels would then slip on the rails."

We must note that the test given on p. 365 for distinguishing between butter and butterine or oleomargarine is incorrect, at least as regards the margarine sold in this country, for margarine sputters more than butter when melted. As they both contain a certain proportion of water this must be so, but margarine melts in a different way from butter, owing to the fats of which it is composed having different melting points.

Taking it all round, however, the book is very good, and, except for the passages to which we have alluded, is eminently clear and simple. Anyone who lives in a house should have a knowledge of the problems contained in this book, for not only will he then be in a position to deal with the various troubles which always arise in connexion with water-taps, lighting arrangements and other matters, but he will also be educated in the thousand and one things which are at once the comfort and the bane of civilised life.

THE LOGIC OF THE UNCONSCIOUS MIND.

By M. K. BRADBY. London: Henry Frowde and Hodder and Stoughton. (Oxford Medical Publications.) 1920. Pp. xiv. + 316. 16*s*.

THE title of this book is somewhat misleading, for it does not deal with any logic peculiar to the unconscious, but with the influence of the unconscious mind on logical thinking. The writer, indeed, denies that the unconscious mind has any peculiar logic of its own, and maintains that "all logic is one, that of rational mind continually developing." Miss Bradby, however, does not give any very explicit account of what she understands by the unconscious mind, and although she deprecates the censure of the psycho-analysts, who declare the unconscious to be non-logical, it seems clear that she is more frequently speaking of the preconscious than of the true unconscious of Freud. For whenever the processes of the true unconscious are in question, as, for example, in dream symbolism, it is hard to see how the logic of identity can be discerned, even in the germ. When the dreamer fails "to distinguish the separate and continuous individuality of things," when "it is not unusual for things to turn into each other, and to be each other, and to be the dreamer," all the rules of formal logic must be inapplicable. But Miss Bradby has little love for formal logic. Those processes of reasoning which are expressions of purpose rather than statements of fact are her chief interest, and the source of logical fallacies which affect the conduct of life rather than their formal classification is the main topic of her book. This source she finds in unconscious motives.

> "We may argue from a false premiss, neglect the laws of deductive inference, argue irrelevantly, use words ambiguously, beg the question, argue in a circle, or fail to apply a general principle to a particular case; but the reason we do so is to be found in unconscious interests and emotions. A thinker can only become more logical by discovering in what direction these habitually tend to mislead him."

This is the main theme of Miss Bradby's book, and it is expounded with a wealth of illustrations derived from many different sources, both ancient and modern, and accompanied by a profusion of references which is somewhat intimidating. Typical cases of illogical conduct are given, many arising in connexion with contemporary political and social problems, and the common fallacies to which we are prone are classified and illustrated by examples. The final section of the book deals with "logic applied to life." Education, social problems, the phenomena of spiritualism, love, and religion, are considered in the light of the views put forward in the earlier part of the book. As is said in the preface, "So vast is the subject of this book that only an enthusiastic amateur would dare attack it on so small a scale." And, indeed, the chief impression we get from Miss Bradby's work is one of intense enthusiasm—an enthusiasm for the rational, for freedom in thought and in life, for the cause of the oppressed, and for the progress of humanity.

A HANDBOOK OF SKIN DISEASES AND THEIR TREATMENT.

Second revised edition. By ARTHUR WHITFIELD, M.D. Lond., F.R.C.P. London: Edward Arnold. 1921. Pp. 291. 18*s*.

DERMATOLOGISTS throughout the world will rejoice that a second edition of Dr. Whitfield's book has at last appeared, for it differs entirely from any other treatise on dermatology. It is not a text-book, but is rather an eminently scientific account of the commoner diseases of the skin, in which the author's own views on their ætiology and treatment are set forth very clearly. For this reason it will be read with great interest by dermatologists, and will be appreciated also by general practitioners and students who have already digested one of the ordinary text-books. The chapter on ringworm infection is particularly good; stress is rightly laid on the importance of eczematoid ringworm of the feet and hands, which, in Dr. Whitfield's opinion, is commoner since the war. The X ray treatment of ringworm of the scalp is described, but a detailed account of the croton-oil method is also given, and will be found useful by practitioners who have no access to X ray treatment.

In his account of staphylococcal infections of the skin Dr. Whitfield states that in several cases of furunculosis he has found the coagulation-time of the blood increased, and he suggests that the apparent beneficial effects of calcium sulphide in some patients may really be due to the administration of calcium. He considers treatment with staphylococcal vaccine of great value, but has found stannoxyl only occasionally successful, and collosol manganese by no means the specific that some writers claim it to be. About the chapter on eczema it may be said that Dr. Whitfield has dealt with this dreaded subject in a very thoughtful and sane manner. With Darier he considers cheiropompholyx merely an acute eczema of the extremities, and points out that some cases of "relapsing dysidrosis" are really epidermophyton infections. It is perhaps unfortunate that the seborrhœides are included in this chapter; we think it would have been better to describe them apart. In considering the ætiology of eczema the author discusses the association of one form with asthma, and thinks that many of these cases are dependent on chronic focal bacterial infection, but the relationship of asthma and eczema to food idiosyncrasy is not considered. The section on the external treatment of eczema is, on the whole, well written, but the management of acute and subacute cases of the disease in seborrhœic persons, which was one of the chief problems of war dermatology, is hardly

dealt with at all, and, since the author is convinced that "there is no internal treatment which has the slightest influence on eczema itself," it is not surprising that there is little to be learnt from his remarks on internal medication. The tuberculides are described fairly fully. There is hardly sufficient justification for the inclusion of lupus erythematosus in this group. No mention is made of the treatment of the true tuberculides, such as Bazin's disease, folliclis, &c., by injections of neosalvarsan and of tuberculin.

One of the most interesting sections is that concerning the treatment of syphilis. In the first place Dr. Whitfield attaches very great importance to the Wassermann reaction, provided that it be carried out by a reliable expert, and he insists that the aim of treatment is to establish and maintain a permanent negative reaction. He believes, moreover, in vigorous treatment by neosalvarsan and mercury in patients with a positive reaction, but with no active clinical manifestations of syphilis. As regards mercurial treatment, he considers the oral administration of hydrarg. c. cret. gr. i. t.d.s. as superior to intramuscular injections. For ordinary cases of early infection he gives three intravenous injections of 0·9 g. of neosalvarsan at intervals of three weeks, and mercury by the mouth; at the end of six months a W.R. is performed, and, if negative, the mercury is continued to the end of the year, when a further test is done. If at either of these two examinations the reaction shows signs of becoming positive, a further course of three injections of neosalvarsan is given. At the end of the year of treatment, if the reaction is negative all treatment is stopped, and the blood is examined at three-monthly intervals. If it remains *clearly* negative a year after treatment has been stopped, the patient is dismissed as cured, but further examinations of the blood are recommended from time to time, and the cerebro-spinal fluid is also tested. We have described this method in detail because it differs materially from that employed by most syphilologists. It is so simple that, if Dr. Whitfield's claims for it are justified, it might well be adopted as a standard method in venereal clinics with much saving of time and trouble.

The descriptions of the tumours of the skin are brief but excellent; we observe that Dr. Whitfield disagrees with Mr. Sampson Handley's view that in Paget's disease of the nipple the epidermal changes are secondary to lymphatic obstruction dependent on malignant infiltration of the underlying tissues. Mycosis fungoides is classed as a primarily malignant disease, and not as an infective granuloma, owing to "the richness in mitosis of the new cellular collections."

In the next edition it is to be hoped that the author will include descriptions of certain diseases of which no mention is made in the present one, even though this may involve an increase in size of the volume. Thus pruritus ani and vulvæ are not considered at all, and we can find no reference to granuloma annulare, the sarcoids, and granulosis rubra nasi. On the other hand, conditions such as chigoe disease, myiasis, cysticercus cellulosæ, glanders, and blastomycosis, which are hardly ever met with in this country, might well be omitted. The illustrations are admirably produced.

JOURNALS.

The Journal of Biological Chemistry (Vol. XLV., 1920-21) contains useful contributions on various problems of nutrition, of which the following may be specially mentioned:—

Relation of Fodder to the Antiscorbutic Potency and Salt Content of Milk (p. 228), by A. E. Hess, L. J. Unger, and G. C. Supplee.—Feeding experiments on guinea-pigs with the milk of pasture-fed cows and cows fed on a dry fodder (antiscorbutic-free) diet, showed that with the milk of the latter all the guinea-pigs developed scurvy within 21 days and died within 56 days, whereas with the pasture-fed milk the guinea-pigs were still alive after 120 days, two only showing mild signs of scurvy. Chemical analysis of the milk showed that pasture-fed samples had a higher calcium, phosphorus, and citric acid content, and although the percentage of protein was slightly greater than in the dry fodder milk, the sulphur content was lower.

The Influence of Diet of the Cow upon the Nutritive and Antiscorbutic Properties of Cow's Milk (p. 119), by A. A. Dutcher, C. H. Eckles, C. D. Dakle, S. W. Mead, and O. G. Shaefer.—Two cows were placed upon a diet poor in vitamine content in the middle of January, and their mixed milk fed in varying quantities to several groups of guinea-pigs. Beginning June 1st, the cows were given a diet rich in vitamine and the feeding experiments repeated. From the data obtained it was concluded that the vitamine content of cow's milk is dependent upon the vitamine content of the ration ingested by the cow. 20 c.cm. of summer milk were superior in nutritive value and in antiscorbutic potency to 60 c.cm. of winter milk. There is a tendency for the milk to become slowly poor in vitamine content when the diet of the cow is low in vitamine, but with a ration rich in vitamine diet the milk becomes of higher nutritive value almost immediately. (For this subject see also Hart, Steenboch, and Ellis, *Jour. Biol. Chem.*, 1920, xlii., 383, and Barnes and Hume, THE LANCET, 1919, ii., 323.)

Studies on Experimental Rickets: I. The Production of Rachitis and Similar Diseases in the Rat by Deficient Diets (p. 333); II. The Effect of Cod-liver Oil Administered to Rats with Experimental Rickets (p. 343), by E. V. McCollum, N. Simmonds, H. T. Parsons, P. G. Shipley, and E. A. Pack.—I. This preliminary communication deals with feeding experiments with various faulty diets. Administration of some of these diets to young rats results in the development of pathological changes in the osseous system which are identical with those found in the bones of rachitic children. Each of the diets described produces in young rats disturbances in the growth and formation of the skeleton. The large variety of dietary formulæ, the administration of which results in rickets and kindred affections, gives abundant evidence of the complex nature of the causes operating in the production of the disease and their analysis will form the subject of later papers. II. Preliminary experiments afford conclusive evidence of the specific beneficial effect of cod-liver oil on rats suffering with experimental rachitis, in that some substance or substances in the oil will cause calcium to be deposited in the same fashion in which deposition occurs in spontaneous healing of rachitis in man. They also prepare the way for the elaboration of a test for the determination of the calcium-depositing potentiality of any substances in terms of cod-liver oil units.

Growth on Diets Poor in True Fats (p. 145), by T. B. Osborne and L. B. Mendel.—Work on the rôle of fats in nutrition is reviewed and the results given of feeding experiments on young rats, with diets presumably containing adequate amounts of both fat-soluble and water-soluble vitamines, but exceedingly poor in true fats (i.e., compounds soluble in pure ether). The authors conclude that if true fats are essential for nutrition during growth the minimum necessary must be exceedingly small.

The Comparative Effects of Thyroid and Iodide Feeding on Growth in White Rats and in Rabbits (p. 69), by A. T. Cameron and J. Carmichael.—Continued small doses of desiccated thyroid gland fed to young white rats produce (*a*) a definite and invariable decrease in growth rate; (*b*) hypertrophy of the organs concerned with increased metabolism—heart, liver, kidneys, adrenals, &c.; (*c*) disappearance of fat (confirmatory of Hoskins and Herring). The decrease in rate of growth is proportional to (*a*) the amount of thyroid fed and (*b*) the iodine content of the thyroid fed; the hypertrophy varies with dose and length of application of dose, and appears to be proportional to the iodine content of the dose. Sodium iodide fed in quantities varying from amounts equal in iodine value to the thyroid doses to amounts 100 times as great produces no effect on growth rate and no hypertrophy. Both thyroid and iodide feeding increase the colloid in the thyroid. Thyroid feeding inhibits the growth of the thyroid, but iodide does not produce this effect. Similar results were obtained from thyroid feeding with rabbits.

The Effect of Alkali on the Efficiency of the Water-Soluble Vitamine B (p. 423), by T. B. Osborne and C. S. Leavenworth.—This investigation confirms the observations of those who have reported the destruction of water-soluble vitamine B when heated with alkalies, but it appears that in attempting to concentrate, or isolate, water-soluble vitamine B dilute alkaline solutions can be used without materially affecting its activity provided that a low temperature and a short time of exposure to the alkali are employed.

Comparative Metabolism of Proteins of Unlike Composition (p. 289), by W. G. Karr.—From experiments on dogs, as far as is indicated by the urinary nitrogenous end products, the metabolism of two proteins, casein and wheat gluten, widely differing in their chemical composition, is essentially the same. In metabolism experiments with comparable quantities of yeast as the sole source of protein, the partition of urinary nitrogen compared favourably with what was observed after feeding with the other two proteins. The utilisation of the yeast nitrogen was about 80 per cent.

Relationship between Cholesterol and Cholesterol Esters in the Blood during their Absorption (p. 255), by A. Knudson.—A series of experiments carried out on dogs, feeding them with cholesterol and cholesterol esters respectively, shows that free cholesterol content of the blood is increased considerably in all experiments during the absorption of the diets, but there is no apparent change in the amount of cholesterol in the ester form.

Other articles deal with quantitative relations of the constituents of various body fluids:—

Determination of Chlorides in Blood (p. 113), by A. S. Whetmore. The Determination of Chlorides in Trichloracetic Acid Filtrates from Whole Blood and Plasma (p. 437), by M. Smith. Simplified Method for the Determination of Chlorides in Blood or Plasma (p. 449), by J. C. Whitehorn. The Determination of Chlorides in Blood Plasma (p. 461), by J. H. Austin and D. O. Van Slyke.—The above papers describe methods in which the removal of blood proteins is carried out with copper hydroxide, trichloracetic acid, tungstic acid, or picric acid, and subsequent estimation of the chloride in the filtrate by the Volhard method or the iodometric method of McLean and Van Slyke. It is concluded that the simultaneous precipitation of blood proteins and silver chlorides is open to error and not advisable. The simplified method form Supplement II. of "A System of Blood Analysis" (Folin) and the thiocyanate titration is made on the protein-free filtrate (tungstic acid precipitation) after addition of standard silver nitrate solution and without removal of the silver chloride precipitate.

The Determination of Sodium in Blood (p. 312), by Edward A. Doisy and Richard D. Bell.—The method of Ball (*Jour. Chem. Soc.*, 1910, xcvii., 1408) depending on the precipitation of sodium as sodium cæsium bismuth nitrite has been elaborated and details are given for the estimation of small quantities of sodium in blood and urine by gravimetric, volumetric, and colorimetric procedure. See also Kramer (*Jour. Biol. Chem.*, 1920, xli., 263) for method of estimation of sodium based upon the insolubility of sodium pyro-antimonate.

Absorption and Elimination of Manganese Ingested as Oxides and Silicates (p. 133), by C. K. Reiman and A. S. Minot.—The analysis of the blood of manganese workers showed no marked variation from the normal manganese content (0·012 mg. per 100 c.cm). Experimental work showed that ores containing manganese as oxides and silicates are soluble in gastric juice; that manganese is absorbed in the blood stream causing a slight temporary rise in manganese concentration followed by a quick return to the normal. In none of the cases studied was the manganese content of the blood increased by the ingestion of manganese ores to a value more than double the normal level, and in some of the subjects no increase was noted. Prolonged feeding of large amounts of manganese ores to dogs failed to produce significant changes in the manganese content of blood and tissues or to cause pathological symptoms. Manganese ores are non-toxic, and in order to produce symptoms of poisoning must be ingested by individuals who are peculiarly susceptible; such individuals are rare.

Gasometric Determination of Nitrogen and its Application to the Estimation of the Non-protein Nitrogen of Blood (p. 223), by R. L. Stehle.—5 or 10 c.cm. of the filtrate obtained from the blood after tungstic acid precipitation are submitted to the usual Kjeldahl digestion, after which decomposition with sodium hypobromite is carried out, and the volume of nitrogen measured. The method is stated to have certain advantages over the Kjeldahl procedure.

The Iodometric Determination of Copper and its Use in Sugar Analysis: (1) Equilibria in the Reaction between Copper Sulphate and Potassium Iodide (p. 349); (2) Methods for the Determination of Reducing Sugars in Blood, Urine, Milk, and Other Solutions (p. 365), by P. A. Shaffer and A. F. Hartmann.—The reversible reaction $Cu^{++} + I^{-} \longleftrightarrow Cu^{+} + I_2$ has been investigated and applied to the determination of the mixture of cuprous and residual cupric copper resulting from the action of reducing sugar upon alkaline copper solutions. The reaction may be caused to take place to completion in either direction, thus enabling the determination by iodometric titration of the cupric or the cuprous copper in a mixture of the two forms. Details of methods for both titrations are given and their application to the determination of reducing sugar in milk, blood, urine, and other solutions.

The Estimation of the Bile Acids (p. 415), by C. L. A. Schmidt and A. E. Dart.—A method is described for the estimation of the nitrogen of bile acids of the taurine and glycocoll series. It is based on the fact that on hydrolysis with NaOH the bile acids are split giving taurine and glycocoll which react quantitatively with HNO_2. The taurine nitrogen can be estimated from the total sulphur-content of the protein-free bile.

A Method for the Determination of Chlorine in Solid Tissues (p. 427), by R. D. Bell and E. A. Doisy.—The method depends on the rapid digestion of the tissue with concentrated sulphuric and persulphuric acid, the digestion gases being carried over by suction into alkaline sulphite solution in which the chlorine is estimated by the Van Slyke-Donleavy method. Details of technique and special apparatus used are given.

Relationship between Plasma Bicarbonate and Urinary Acidity following the Administration of Sodium Bicarbonate (p. 101), by W. J. Palmer, H. Salvesen, and H. Jackson, jun.—In normal and pathological cases following the administration of sodium bicarbonate the plasma bicarbonate CO_2 approaches 68·7 ± 10 volumes per cent. at the time the first depressing effect of the alkali on the urinary acidity is noted. The use of the first significant effect on the pH of the urine, therefore, in controlling the therapeutic use of sodium bicarbonate, is safe and reliable, but owing to the inconstancy of the level of the plasma bicarbonate CO_2 at this point the accurate estimation of the degree of diminished alkali reserve cannot be made. The observation of Palmer and Van Slyke is confirmed that "absorbed sodium bicarbonate is distributed in approximate uniformity ..... to the blood"; and "the effect of a given dose in raising the plasma bicarbonate may be calculated by assuming that the body contains 700 c.cm. of fluid per kilo and that the bicarbonate is distributed therein uniformly." On this subject see also Calvert, Myers, and Milroy, *Jour. Path. and Bact.*, xxiv., 91, 1921.

Relation of the Alkali Reserve of the Blood to Glycosuria and Hyperglycæmia in Pancreatic Diabetes (p. 51), by B. M. Hendrix and C. Y. Crouter.—A decrease in the alkali reserve of the blood, as shown by the CO_2 capacity of the plasma, is not simultaneous with the appearance of hyperglycæmia and glycosuria in pancreatectomised dogs. A slight increase in the CO_2 capacity of blood plasma was observed on the first or second day after removal of the pancreas, later decreasing and gradually reaching about 30 volumes per cent. in two cases. Definite acidosis appears comparatively late in pancreatic diabetes in dogs.

Studies of the Distribution of Carbon Dioxide Between Cells and Plasma (p. 245), by L. W. Smith, J. H. Means, and M. N. Woodwell.—From the investigation of the CO_2 content of the whole blood and plasma of both venous and arterial blood it has been found that as the blood passes from the arterial to the venous side of the circulation in normal man its corpuscles gain from 4 to 11 volumes per cent. of CO_2; the corresponding gain in the plasma is only from 0·0 to 1·8 volumes per cent., and the conclusion is drawn, therefore, that the transport of CO_2 is accomplished mainly by the corpuscles. The same holds true in anæmia and certain other diseases, although the actual distribution of CO_2 between cells and plasma is altered.

New Inventions.

A DIRECT RECORD SCOTOMETER

FOR INVESTIGATING THE CENTRAL FIELD OF VISION.

VARIOUS instruments have been devised for the purpose of mapping out central fields of vision, but the chief difficulties in this kind of perimetry have been due to the slowness of the means of taking the observations. For the past two years I have been using an instrument which overcomes this difficulty. Observations may be made quickly and accurately, and at the same time a direct record of the observations is taken. The apparatus consists of a rigid iron stand to which is fitted a frame carrying the screen against which the observations are to be made. The screen is of grey cloth, fixed into it in the central position is a small white metal stud; this is the fixation point. Behind the screen is a sheet of carbon and a paper chart, ruled for convenience in the usual degree circles and radii. Red and blue tracing papers are also supplied, which enable three records to be taken, at intervals, on the same chart. The object is carried on a suitable object holder and held in the surgeon's hand, which is obscured from the patient's view by a grey cloth bag-glove. At the back of the

frame knobs are fixed in the usual positions of the blind spots, so that the surgeon has a reliable guide from which to work. In taking observations the patient's face at the naso-buccal groove is pressed against the knob on the free upright of the stand. One eye is covered, the other looks at the fixation spot. The surgeon moves the object over those parts of the field he desires and notes when the patient sees it and when he does not. The records of the observations are made by pressing the small style on the back of the object holder against the screen, when the impress is conveyed by the carbon sheet to the chart. The whole of the movements of the object over the screen may be traced in this fashion by a light continuous pressure and salient points marked by deeper pressure.

The real advantage of this recording instrument is the speed and accuracy with which observations may be made. If the surgeon has to move about, take notes, shift the instrument, or do anything that takes time or diverts the patient's attention, accuracy of observation is diminished or indeed may be lost entirely.

The instrument has been well made by Messrs. John Weiss and Son, Ltd., of 287, Oxford-street, London, W. 1.

N. BISHOP HARMAN,
M.B., B.C. Cantab., F.R.C.S. Eng.

THE LANCET.

LONDON: SATURDAY, APRIL 16, 1921.

Sanatorium Treatment under the County Councils.

ON May 1st next sanatorium benefit under the Insurance Acts ceases to exist and the duty of providing institutional treatment for persons suffering from tuberculosis falls to the county councils. Parliament will be asked to vote a sufficient amount of money to the Ministry of Health to enable grants to be made to the councils equal to the lapsed sanatorium benefit income, and the annual Exchequer grant will make up the amount to one-half of the approved expenditure. A further 50 per cent. grant is to be sanctioned to provide extra nourishment for patients not in residential institutions provided the amount expended for this purpose does not exceed £2 per 1000 of population. Some restiveness is apparent in the House of Commons at the increasing burden on tax- and rate-payers on account of the residential treatment of tuberculosis. It is, perhaps, not an unmixed evil that sanatorium treatment is at present the subject of much criticism. Were its position secure there would be little hope of lifting it out of a stereotyped groove and of remoulding it in conformity with present needs and recent advances in our knowledge of tuberculosis. A curious feature of many criticisms of the results of sanatorium treatment is the total absence of any definition of the term "sanatorium treatment." Yet it is obvious that definition should precede discussion. We must, for example, define the time limit within which residence in a sanatorium is so short that the patient cannot, in common fairness, be said to have enjoyed sanatorium treatment. No one would condemn university education because an undergraduate who left college at the end of his first term proved an illiterate man. But sanatorium treatment is freely condemned in this country because many patients relapse after three months' treatment in a sanatorium. No case of active pulmonary tuberculosis has ever been cured in three months by sanatorium treatment, and no case ever will be. Though it is easy enough to fix the limit within which sanatorium treatment is farcically inadequate, it is a far more difficult task to fix the maximum limit beyond which sanatorium treatment can do no further good; for, as Dr. J. CROCKET [1] has pointed out, a brilliant result achieved by three years' sanatorium treatment would probably have been stultified had this treatment been limited to two years.

Apart from the question of time, there are very divergent views as to what constitutes sanatorium treatment. Wielding a pick and shovel, sleeping in a draught, and imbibing much milk is the order of the day in certain institutions where the comparative amounts of rest and exercise are graduated by the mouth temperature and by such signs of toxæmia as headache and lassitude. In other institutions no exercise but walking is allowed, and then only in carefully graduated doses, auto-inoculation is controlled by the rectal temperature taken many times a day, the warmth and general comfort of each patient are studied, and the physician plays the part of providence in tempering the wind to the shorn lamb. Again, in several sanatoriums an elaborately devised system of heliotherapy has lately been introduced, while in others hydrotherapy plays an important part. Many other methods included under sanatorium treatment could be mentioned, but the diverse systems referred to will suffice to show how varying are the conditions under which patients are put when given "sanatorium treatment." The time may come when sanatorium treatment will be "standardised" by the elimination of comparatively useless or even harmful methods, and by concentrating only on those methods that survive the test of time; and in the meantime our judgment of the results at present achieved should be tempered by the regretful admission that the term "sanatorium treatment" covers a variety of methods of very different value. Another important factor in the problem of sanatorium treatment is the class of case selected for this treatment. In the past the selection of candidates for admission has often been determined by other considerations than those actuating the medical advisers consulted. And, more unfortunate still, it has often happened that advanced and incurable cases have been given long spells of sanatorium treatment at the expense of early cases which are discharged after a few months. A most important step to remedy this state of affairs has lately been taken by the London County Council, the Public Health Committee of which has recommended that all patients should, if possible, be passed through observation beds before being sent to an institution such as a sanatorium. By the reservation of 250 such beds at the Brompton Hospital, and 75 at the City of London Chest Hospital, and by the detention of patients in these beds for two to four weeks, valuable information can be obtained as to the needs of the individual case, and an example is set which will no doubt be followed by other bodies concerned with the welfare of the working-class tuberculous patient. It is a curious fact in the evolution of sanatorium treatment that, while preventoriums and sanatoriums for children often have waiting lists, sanatoriums for adults are sometimes only partly filled, although the sanatorium accommodation available for adults is, in theory, notoriously inadequate. This tendency may, perhaps, be a reflection of the results achieved by the two classes of institution, and we would venture the prophecy that sanatorium treatment will more and more develop on the lines of prevention in the young than "cure" in the adult.

In a recent report [2] five of the leading tuberculosis specialists in Canada have published the results of a tour of inspection of 26 Canadian sanatoriums. Appointed by the Department of Soldiers' Civil Re-establishment, these specialists were given the task of scrutinising all the conditions under which soldiers were treated in sanatoriums and other institutions for the tuberculous. This report dwells on the facts that "the vast majority of patients are treated for too brief a time," and that the "medical service of most sanatoria was relatively under-staffed." Some,

[1] THE LANCET, April 2nd, 1921.

[2] Summary of Report, Board of Tuberculosis Consultants, December, 1920, Ottawa. Copies sent gratis to any physician interested.

indeed most, institutions were run as well as circumstances permitted, but in others "inadequate medical supervision was responsible for an atmosphere of depression ....." Many other pertinent observations are made, the shady as well as the sunny side of sanatorium administration being shown up in true relations. This searching survey and candid discussion will provoke in those concerned with sanatorium treatment a divine discontent with all that is make-shift and second-rate. Such a tour of inspection in this country, if it were made by a body of experts with many years of sanatorium experience, would, no doubt, ultimately do much to raise the standard of sanatorium treatment. Already there are certain influences at work which should help to promote efficiency in the sanatorium service. Under Dr. JANE WALKER'S vigorous direction the Society of Superintendents of Tuberculosis Institutions has become a vocal body which, to judge by the reports of its various subcommittees just issued, is animated by the ambition to set its house in order. A tell-tale book with the title of "Anti-Tuberculosis Reconstruction,"[3] by an author who designates himself D.P.H., R.C.P.S.I., shows an almost uncanny knowledge of the seamy side of the sanatorium service, and the proposals for the betterment of the tuberculosis service of the country are evidently the offspring of long and varied experience. These and similar influences augur well for the future. At present, however, the position is obscured by conflicting evidence; on the one hand, Dr. E. WARD[4] thinks that the calculation that two out of 10 early cases are cured or materially relieved by sanatorium treatment is too optimistic; and, on the other hand, Professor SAUGMAN[5] has shown that complete and permanent recovery can be effected by sanatorium treatment in eight to nine out of every 10 cases of early pulmonary tuberculosis.

Income-Tax.

THE new Revenue Bill just introduced, separately from the annual Finance Bill, contains provisions regarding income-tax to which members of the medical profession will, sooner or later, require to attend personally or by deputy. If the profession is nowhere specifically mentioned in the Bill, there are many provisions in which incomes of the average professional sort are concerned. The Bill, indeed, contains only one clause which relates to other than commercial or professional aspects. By that clause power is given to the taxpayer to require the Bank of England to deduct tax from interest on dividends on War Loan and other Government securities which would otherwise in ordinary course be payable without deduction of tax at the source. Presumably some desire must have been manifested for this discretion, but we cannot say that we are impressed with its advantage as against allowing the tax to be directly assessed. However, the power is there, and no doubt there are cases where it may be useful. With this exception the Bill contains nothing that can be described as of a domestic nature. There is no change in the family allowances, and the subject of wear and tear is never mentioned. In an obvious direction this is of importance to our readers, for it leaves the medical profession where it is as regards any allowance for cars. There can be no account taken of wear and tear—in other words, there is no allowance for depreciation. But all repairs are chargeable, and can be brought into account for remission of tax; also renewals where one car is exchanged for or replaced by another will be allowed for, less the salvage of the old car.

These matters concern a section of the medical profession, but all will be affected by the new basis of assessment. Public appointments are to remain chargeable on the figure of the year of assessment. But ordinary professional profits are to be placed on a new basis, beginning with the tax year 1922–23—that is, one year hence. The basis is at present the average of the three preceding years, but in the following year the basis will be altered to the figures of the year preceding. Thus in 1922–23 the tax will be charged on assumed profits equal to the actual ascertained profits of the last professional financial year, according to the date on which the accounts of the practice are usually closed. That, for instance, may be the present calendar year 1921. The rules will remain the same as at present, but there are important new regulations applicable to new practices, discontinued practices, successions in practice, and partnership changes. These matters are too involved to be gone into here. To mention their existence is to justify the advice that the medical man should study all the directions closely, and should not be reluctant to call in expert aid. He may often need it.

There is one thing to which attention ought to be distinctly directed, and that is the possibility of hardship on changing over from the one assessment basis to the other. Thus, suppose the accounts of the practice are made up annually at Dec. 31st. If the present system of the three years' average continued in force, the 1922–23 assessment would be on the average of the years ending Dec. 31st, 1919, 1920, and 1921. But under the new basis the standard will be the 1921 profits only, and it may easily turn out that those are materially higher than the average of 1919–1921. If so, there may be a remedy; but it will be hopeless, it seems to us, to expect to obtain it if there are not accounts in existence for a good many years back. There is no remedy unless the practitioner can prove that the profits of 1919 *or* 1920 were less than the average of the six years preceding 1919 (1913–1918). If this can be proved then the practitioner will be entitled to claim that the assessments of 1922–23 and 1923–24 shall be made on the present three years' average basis. In that case the assessment for 1922–23 would be on the average of 1919–20–21, and that for 1923–24 on the average of 1920–21–22. That would be the end of the exceptional transition relief, and the assessment for 1924–25 would be on the profit of 1923.

Hypno-Narcosis.

GREAT discoveries seem to bide their time and to appear when due almost irrespective of human agency. Otherwise it would be difficult to explain how DARWIN and WALLACE came to propound independently the principle of evolution, why Neptune was discovered simultaneously in two observatories, or whence exophthalmic goitre derives its three eponyms. So it was that painless operating emerged during the eighteen-forties in

[3] Maunsel and Co., Ltd., pp. 38, 6*d*.
[4] THE LANCET, March 12th, 1921.
[5] Meddelelser fra Vejlefjord Sanatorium, 1920, G. E. C. Gad, Copenhagen.

four several places, and with a different method in each. The tale of nitrous oxide (1844), of ether (1846), and of chloroform (1847) has often been told, but it is not so often recalled that in 1845 JAMES ESDAILE, at the Native Hospital, Hooghly, performed the first painless operation under what was then known as mesmeric influence. Before he left India in 1851 he claimed to have performed thousands of painless minor operations and some 300 capital ones. JAMES BRAID, surgeon, of Manchester (1795–1860), to whom we owe the term hypnotism, did not himself use it as an analgesic for other than dental extractions and small surgical interferences such as the opening of an abscess. Hypnosis as an analgesic could hardly expect to get a fair hearing in a world newly impressed by the magic powers and apparently simple technique of ether and chloroform. To the *Deutsche Revue* of March Professor A. A. FRIEDLÄNDER, of Freiburg-i-B., contributes an interesting article on the psychology of hypnosis and its relation to surgery, in which he goes over with striking fairness some of this old ground. He points out of what inestimable value for suffering humanity were the experiments of BRAID and ESDAILE, and how they were rendered nugatory by the rapid popularisation of narcotic drugs. From his own experience of hypnotic phenomena Professor FRIEDLÄNDER became convinced that hypnosis could be enlisted to aid surgery in a fashion quite different from that in which BRAID had used it. From 1905 on he was led to treat patients by hypnotic suggestion before and during operation, calling this combination of hypnosis with narcosis hypno-narcosis.

The advantages of hypno-narcosis in its author's hands are these. Light hypnosis induced before an operation will establish the patient's equanimity and prevent the natural anxiety associated with the operation and with the taking of an anæsthetic. The principal induction takes place just before the operation, the patient then being slowly anæsthetised so that the narcotic state supervenes upon the hypnotic. Narcosis ceases as soon as the operation is completed and hypnosis is again brought into use. The benefits are immediate. The amount of narcotic used is reduced by one-third, or two-fifths of what would otherwise be required. Any toxic action is, therefore, of the slightest, after-effects being correspondingly reduced. The patient awakes from a sleep rather than from a narcosis. A similar treatment may be employed in childbirth, the patient being fortified by preliminary suggestion. The small consumption of the anæsthetic is specially important in Germany in view of the present high cost of chemical products. Hypnotic after-treatment is directed to securing rest and sleep. In this way secondary hæmorrhage is avoided, and the recourse to sleep-inducing drugs. Prolonged hypnotic sleep extended over hours, or even days, renders possible any special treatment of the patient, forced feeding, and the establishment of physical and mental repose. All this without any alteration of the surgical department other than the addition of an assistant instructed in psychotherapy, for skill in inducing hypnosis is all-important. Professor FRIEDLÄNDER sees a great future for hypno-narcosis. It is destined, he thinks, to become the common property of practising physicians, and to play the part in therapy that anatomy accomplishes for surgery. Without supporting him all along these diverging lines we may say that he makes out a good case for extended trial of hypno-narcosis.

Annotations.

"Ne quid nimis."

THE NECESSITY OF REGISTRATION.

IN view of the recent legislation and prospective regulations, medical practitioners are reminded that no matter what qualifications may be possessed, a man is not "legally qualified" or "duly qualified" unless he is registered; and that the Medical Register is alone evidence upon this point "until the contrary be made to appear." For those who specially require them, lists are prepared each month giving the names of all those registered during the month, and also of those who have died or whose names have been removed from the Register for any other reason. All communications should be addressed to the Registrar, General Medical Council, 44, Hallam-street, London, W. 1.

THE RÔLE OF PREFORMED CARBOHYDRATES IN NUTRITION.

THE interesting question whether preformed carbohydrate in the diet is required for growth has recently been raised by T. B. Osborne and Lafayette B. Mendel, of Yale University, in the number of the *Journal of Biological Chemistry* reviewed in our present issue. Their results would seem to show that even what are now considered established principles in dietetics may require revision, for carbohydrates are ordinarily regarded as indispensable components of the food intake. This belief is based on the presence of more or less carbohydrate in the food mixtures consumed by the higher animals and man and on the fact that sugar is a constant constituent of the blood. Some observations connected with diabetes seem to confirm this view; since ketone substances may be excreted in diabetes when sugar fails to be burned up in the normal manner, it would seem that carbohydrates are essential for the proper metabolism of the fats. It is known, however, that meat contains very little carbohydrate; yet purely carnivorous animals grow and maintain health on a practically pure animal diet. What can then be said about omnivorous vertebrates? Rats were fed successfully on rations which included protein—casein, edestin, or lean beef which had been thoroughly extracted with boiling water—inorganic salts, agar-agar, lard, butter-fat, and 0·4 g. daily of dried brewery yeast furnishing vitamin B. The yeast can scarcely be regarded as a significant source of available carbohydrate. Success was likewise attained in experiments in which no agar-agar was given. In these experiments the only obvious sources of preformed carbohydrates were the yeast employed and such carbohydrate impurities as might still adhere to the protein preparation in the dietary. Osborne and Mendel, as the result of their experiments, found that rats receiving a diet in which the amount of carbohydrate was at most exceedingly small can grow from an early age to adult size.

TOWN SCHOOL HYGIENE.

"It would pay local authorities to scrap all school buildings in the centre of the cities and to build on the outskirts, where the winds blow, the flowers grow, and the birds sing."

THIS ideal was set by Mr. C. T. Wing, the representative speaker at the recent conference of the National Union of Teachers at Bridlington. It is in essence a plea for rural life and the open-air school, natural enough at a holiday conference on the bracing East Coast, but it may be doubted whether the proposal would justify itself economically. The borough of Poplar has recently demanded the rebuilding of its schools, but Dr. Leonard Hill has shown that if overheated air is avoided and constant movement of air ensured, healthy physical conditions of atmosphere can be obtained in the centre of a town as well as in the country. Rural and urban schools evidently share

the same disadvantages to a large extent. Many village schools are insanitary. Much of the trouble arises from the control of the schools being much in the hands of a section of the community other than that which uses them. If every child in the country, irrespective of the amount of income his father earns, had to put in five years in an elementary school, that school would be a different place. Knowledge of school hygiene is still ahead of its practice. Teachers appear to be moving forward to take their place as professional workers, but they have still to realise as a whole that they must teach for physical as well as mental results. Over and over again, before the school doctor came on the scene, teachers were shown how filthy were the heads of school children, a fact which hardly needed the elaborate statistical analysis given to it in official reports. The plea raised by speakers at the same conference that teachers should attempt to improve their status would be greatly strengthened if they determined to add to their equipment a competent knowledge of the physical conditions requisite for the growth and development of their charges. Hitherto this side of the teachers' work has needed continual impressing upon them by outsiders. Cleanliness, neatness, tidiness, and a joyous outlook on life are requisites whose importance is urgent in these days when the basic value of Freud's discovery is emerging from the slime with which it has been surrounded. The all-powerful effect on the juvenile mind of suggestions of healthy ways and means cannot safely be neglected by any teacher, for one-ninth of a child's life during educational years is passed in school. Still, it is only a ninth, and the slum in which the remaining eight-ninths is spent will pay better for improvement than will the removal of schools to the suburbs.

A FATAL PRACTICAL JOKE: PNEUMATIC RUPTURE OF THE INTESTINE.

Dr. J. R. Buchbinder has reported a fatal form of joke which has been practised in America for some years—we have ourselves reported instances of its occurrence. A man was admitted to the Wesley Memorial Hospital, Chicago, with the history that two hours before, while stooping, a fellow-workman had placed the nozzle of an air hose close to his rectum. The nozzle had an inside diameter of 1¼ inches, and delivered air at a pressure of 85 lb. The man screamed with pain and collapsed. On admission he was in a state of profound shock. His face was slightly cyanosed and respiration was scarcely noticeable. While being lifted into bed, and thereafter until removal to the operating-room, he was seized with violent clonic spasms of the trunk. The heart was scarcely audible. The abdomen was greatly distended, but the distension was different from that of peritonitis; the tension was so great that the palpating hand could hardly make an impression. The abdomen was not merely rigid; it was extremely hard. The skin of the chest, abdomen, scrotum, penis, and perineum was emphysematous. Under procaine anæsthesia a left rectus incision was made. The transversalis fascia was not incised, but sharp-nosed forceps were pushed through in order to control the escape of air. The fascia tore like wet paper under great tension, the air rushed out with a report, and the abdominal wall dropped in. The sudden escape of air proved nearly fatal, but in a few minutes the patient rallied. There was a tear in the convexity of the sigmoid, which admitted three fingers. For a distance of 6–8 inches the serosa was stripped off and ribboned. The colon was collapsed and practically empty. The mucosa had herniated through the tear in the serosa and was frayed out as though it had been scraped. The meso-sigmoid was studded with small hæmorrhages, but there was little blood and no fæces in the peritoneum. The sigmoid tear was closed and the peritoneum sutured as well as it could be with what was left of it. A loop of descending colon was pulled out for colostomy. The patient was returned to bed and treated for shock, but died without fully recovering from it four hours later. The necropsy showed that the anus and rectum had escaped injury, probably because of pelvic support. The colon, from the sigmoid to the splenic flexure had become gangrenous, which was attributed to destruction of its blood-supply by the impact of air. The remainder of the intestinal tract showed no injuries. In *Surgery, Gynecology, and Obstetrics* for January, 1911, E. W. Andrews collected 15 cases[1] of this injury, of which 13 were fatal, and reported one in which the damage of the sigmoid was so great that he performed lateral anastomosis and the patient recovered. In the same journal for January, 1914, Bendixen and Blything reported a case in which operation was successful and added six more cases. The combined statistics give a mortality of 81 per cent. in cases in which operation was performed. When no operation was performed the mortality was over 90 per cent. In most of the cases the anus and rectum escaped injury. In nearly every case the sigmoid was the site of injury probably because its loop and kinked junction with the descending colon offers obstruction to the rush of air. The peritoneal coat was torn to ribbons and the mucosa protruded. Dr. Buchbinder recommends that the intraperitoneal pressure should be immediately relieved, allowing the air to escape slowly, preferably by a rectal tube, and then that laparotomy be performed under local anæsthesia for repair of the ruptured bowel. Colostomy should be considered when there is extensive destruction at the site of rupture or when the blood-supply of a considerable length of colon is compromised.

MILITARY AMBULANCE TRAINS.

QUICK transport for wounded and sick of the armies from the battle line to the base hospitals came to be of far greater importance in the late war than in previous wars. The large numbers of slightly wounded and sick who were quickly cured with proper treatment away from the front, and so able to resume their active parts in the war within a reasonable space of time must have formed important items in the military use of man-power. There was also the humanitarian consideration. Swift and comfortable transport saved many lives and an almost incredible amount of suffering. From the point of view of medical administration, there was also the enormous relief given to casualty clearing stations. During a heavy engagement thousands of wounded would be collected at a C.C.S., many more than the available accommodation would hold, and many more than the medical and nursing staff could cope with, even working 24 hours a day. By the use of ambulance trains it was possible to keep selected and urgent cases at the clearing stations, and yet be sure that the remainder would immediately get food and medical attention, and that within a few hours they would be right away from the battle zone at base hospitals. An instructive chapter in Mr. E. A. Pratt's book "British Railways and the Great War," tells us of the development and organisation of ambulance trains. Mr. Pratt points out that the experience of the South African campaign had been embodied in plans drawn up before the outbreak of the late war for immediate expansion of the ambulance-train service. Five ambulance coaches were used constantly from 1900 onwards by the L. and S. W. Railway to transfer sick troops arriving at Southampton from India and elsewhere to inland hospitals. These were expanded to 30 fully equipped hospital trains for overseas ambulance work. Further, by the end of the war 19 trains had also been provided for the United States Army, bringing the total of overseas ambulance trains supplied by the railways to 49. Moreover, some 24 of these trains were organised for service in England. This work was carried out by committees chosen from general managers and superintendents of the railways, the military organisation being under Sir William Donovan and his staff. The story is one of ever-increasing demands for trains and also of steady improvement in their standardisation. A typical train was composed of 16 vehicles—viz., one combined brake-

[1] See THE LANCET, 1911, i., 524.

car for lying infectious cases, one staff car, one kitchen and sitting officers' car, nine ordinary lying ward-cars, one pharmacy car, one kitchen and mess car, one car for personnel, and one brake and stores car—accommodating lying cases 320, sitting 76 (at least), staff 8, personnel 39—total 443. Each new train conformed to this general standard, but each had its improvements. To develop an organisation to supply all the ambulance trains overseas and for the extremely wide distribution of patients in Great Britain was no light undertaking. Arrangements were made to send the patients who were entrained chiefly at Dover and Southampton to hospitals which had sprung up in all parts of the country, and an extremely complicated system had to be evolved to enable the authorities to know how many beds were vacant in all and in each of these hospitals, what class of cases they took, and how best to divide, say, a shipload of 500 patients amongst these various institutions, and avoid waste of mileage and of beds. Combined with this work were the transfers from hospital to hospital in the United Kingdom, designed to place patients nearer their own homes or in special hospitals From the outbreak of war until April 7th, 1919, the total number of sick and wounded received into ports in the United Kingdom and conveyed therefrom in ambulance trains was 2,680,000. These were distributed all over the country to 196 receiving stations, trains going as far north as Aberdeen. Mr. Pratt closes his excellent account with a short summary of the ambulance work done by railwaymen.

THE TRANSMISSION OF KALA-AZAR.

THIS very fatal disease has long presented difficulties to investigators desirous of discovering the methods of its transmission. Its specific organism, the Leishman-Donovan body (*Leishmania donovani*), is a protozoon which is stated to pass through three stages of development (pre-flagellate, flagellate, and post-flagellate). The chief endemic area of kala-azar is at present in Assam, where, according to recent reports, an increased incidence has been observed during the last three or four years. Formerly the case mortality-rate of kala-azar in Assam was at times as high as 98 per cent., but a reduction has lately been effected by the treatment of cases by the intravenous injection of tartar emetic. The ætiologist has been anxiously striving to find out how kala-azar is spread so that appropriate measures might be formulated for preventing its diffusion, but as yet without much success. In the *Indian Journal of Medical Research*, Vol. VIII., No. 1, Captain R. Knowles, I.M.S., of the Pasteur Institute, Shillong, Assam, has published a series of "Studies of Kala-azar," in one of which he deals with some of the possible methods by which the disease may be transmitted. The occurrence of direct fæcal transmission from person to person by contamination of hands, bedding, clothing, &c., is quite possible, for dysenteric symptoms are generally present in kala-azar cases throughout the course of the disease, and the bedridden, dying patient commonly contaminates, by his bowel discharges, his clothes, and bedding, as well as the floor of the house and the furniture. It is known that the natural intestinal flagellates of insects are transmitted from insect to insect in encysted form through the fæces. It is certain that in man *L. donovani* is passed from the ulcers of the intestinal mucosa into the fæces. So that if the infection is transmitted by means of fæcal contamination, the parasite should be present in the stools in some encysted or resistant form not yet discovered. In the careful investigations conducted by Captain Knowles at Shillong, however, no positive results were reached to support the above views; nevertheless, he concludes that this possibility deserves more careful consideration than it has hitherto received from investigators. It is also worth noting that in Assam, at least, the distribution and incidence of kala-azar is closely associated with insanitary conditions and with an absence of proper provision for excrement disposal.

The almost universal prevalence of hookworm disease in Assam has led to the suggestion that perhaps the ankylostoma may act as a carrier of the kala-azar infection to man. To test this suggestion Captain Knowles carried out a series of careful experiments extending over a period of two and a half years; but he failed to obtain any results in support of it. The hookworm may possibly be a secondary host of the kala-azar parasite, but there is no experimental evidence at present in favour of the suggestion. For some years, and especially after the work of Patton was published, it was believed that the Indian bed-bug was the transmitting agent of kala-azar. More recently other ecto-parasites have also been suspected, including pediculi and acarinæ. The position as regards the relation of the Indian bed-bug and kala-azar seems at present to be that either the bug is the true secondary host, and the infection passes by salivary infection, or, on the other hand, that there is so close an approximation to a true cyclical development of the *L. donovani* in the bed-bug that the true cycle may occur, not in the bed-bug itself but in some other blood-sucking insect. Captain Knowles points out that the flagellate body is almost certainly a part of the extra-human cycle of the parasite, otherwise, he asks, why it should develop uniformly in both culture medium and the mid-gut of the bug. On the other hand, serological work, and the great difficulty met with in attempts to infect animals experimentally with flagellate cultures, seem to indicate that the flagellate body is not the final stage of the parasite infective to man. The form of *L. donovani* infective to man is probably some post-flagellate stage of development of the organism. The experimental investigation of kala-azar is greatly hindered by the want of an animal which can easily and certainly be infected under experimental conditions. The incidence of the disease among Europeans in Assam has so far been limited to males, and the suspected channels of infection seem to be confined to ecto-parasites, such as the bed-bug, louse, or acarus, or to be the result of infection possibly acquired elsewhere, as, for instance, through infected ankylostoma larvæ on the tea-garden soil getting into the human body through leaky or damp boots. The incidence of kala-azar in young children negatives the suggestion that coitus is the usual mode of spreading the disease. Lastly, Captain Knowles states that, whatever the true ætiology of kala-azar may be, three factors seem essentially concerned in its spread—namely, close personal contact, site infection, and repeated or prolonged exposure to the infecting agent. Proof that there existed some extra-human reservoir of the infection in some animal, amphibian, reptile, or fish, would explain several of the most puzzling features of the epidemiology, its occasional latency on the one hand, and on the other the existence of areas so saturated with the infection that every living person in them becomes infected sooner or later. Captain Knowles's investigations, we are glad to learn, are being continued.

LONDON AND COUNTIES MEDICAL PROTECTION SOCIETY.

THE annual general meeting of this society was held at 32, Craven-street, London, on Wednesday, April 6th, the President, Sir John Rose Bradford, in the chair. Sir John Rose Bradford, in proposing the reception of the annual report and balance-sheet, pointed out that the number of members added to the society during the year had been very considerable, while the strength of their organisation was proved by the fact that, unlike so many other associations, their annual subscription had remained unaltered. DR. C. M. Fegen, the honorary treasurer, in seconding the motion from the chair, stated that a reserve fund of £30,000 had been banked up by the Society, the expenditure had been carefully guarded, and that the value of their securities had been written down as lately as last December, so that the members might not be deluded into thinking that their very good position was a better one still. Dr. C. O. Hawthorne moved an amendment approving of the annual report but asking that the Council should reconsider a decision to send representatives to the Federation of Medical and Allied Societies. He took up no legal standpoint, but submitted that the money paid by the

members of the Society was intended for particular purposes in which the pursuit of a medico-political policy was not included. The amendment having been duly seconded, the policy of the Society in subscribing to the Federation was defended by Dr. Fegen, who pointed out that the value of being affiliated to the Federation would be that sympathetic hearing could be secured from Governments, which could not pass over joint representations as they could those of individual groups. Two members only having voted in favour of the amendment the original motion, that the report and balance-sheet be adopted, was put and carried *nemine contradicente*. The meeting ended with the re-election of Sir John Rose Bradford as President, Dr. Fegen as treasurer, Mr. A. G. R. Foulerton as financial secretary, and Dr. Hugh Woods as general secretary, and all the appointments were received by the meeting with great cordiality.

AN ECHO OF THE WAINWRIGHT MURDER CASE.

Mr. F. G. Larkin, who was one of the chief medical witnesses in the Wainwright case 45 years ago, has presented to the medico-legal collection of the Royal College of Surgeons of England the uterus and neighbouring pelvic parts of Harriet Lane—Henry Wainwright's victim. The evidence relating to this case is very clearly given by the late Mr. H. B. Irving in the Notable Trial Series. It will be remembered that Wainwright placed the dead body of his victim under the floor of his workroom, where it lay, surrounded by quicklime, for the greater part of a year. Yet at the end of this time Mr. Larkin was able to recognise that the body was that of a woman who had probably borne children. The identification of Harriet Lane was made, however, on other grounds. And this was fortunate, for at the Obstetrical Society Dr. Alfred Meadows read a note of the evidence which he gave at Wainwright's trial, in which he pointed out that the organ presented appearances not believed to exist in a uterus which has been gravid.

THE "HÉMOCLASIQUE" CRISIS.

IN a recent communication P. Brodin and Charles Richet[1] use this term to describe the circulatory changes which occur in anaphylactic shock, or which follow the intravenous injection of peptone. These changes, most of which have been noted by other observers, are the following: fall of blood pressure, delay in the coagulation of the blood, concentration, leucopenia, and, finally, changes in the viscosity and refractive index of the serum. These occur in both conditions, but in anaphylactic shock there are two additional phenomena—i.e., the appearance of nucleated red corpuscles and a change in the normal differential leucocyte count. Biedl and Krauss some years ago drew attention to the resemblance between the respiratory symptoms and the pulmonary lesions in these two conditions, and Brodin and Richet now present the additional evidence of the similarity of their "hémoclasique" crises, as proof, if not of their absolute identity, at least of the very close relationship between them. There can be little doubt that in the dog such a close resemblance exists between peptone poisoning and anaphylactic shock, for in this animal the point of attack is, in both cases, the endothelial lining of the capillaries. In the guinea-pig, however, anaphylactic death is due to the asphyxia which follows the contraction of the plain muscle of the bronchioles, and though peptone in sufficient dose also produces such contraction of the bronchial musculature with acute asphyxial death, it can cause subacute death in smaller doses by its action as an endothelial poison. No superficial resemblance between the blood changes in these two conditions can obliterate the essential difference in poisonous action of peptone in the normal, and the specific antigen in the sensitised animal, the former functioning as a general endothelial poison, and the latter, as Dale and Weil have shown, following the union of specific antibody with antigen within the body cells. More important are the experiments in "crossed immunity" which Brodin and Richet report. A series of 13 dogs were sensitised by a preliminary injection of horse serum. One or two months later seven of these were given large doses of horse serum intravenously, with the result that one died of acute anaphylaxis, and three others showed severe symptoms. The remaining six dogs were given an intravenous injection of peptone one hour before they received the "déchainante" injection of horse serum, which in this case caused no symptoms in one dog and only slight effects in the others. This experiment affords some evidence that peptone administered to the sensitised animal affords a partial protection against the subsequent injection of the specific antigen. The dose of peptone used was rather large, 0·1 to 0·15 g. per kilo of body weight, about half the dose necessary to render the blood of a dog incoagulable. This fact renders the experiments inconclusive in regard to the possible value of intravenous peptone injections as a prophylactic measure against anaphylactic shock in man.

[1] Brodin and Richet: Compt. Rend. Soc. de Biol., lxxxiv., 298.

THE MANUFACTURE OF AERATED WATER AS A DANGEROUS INDUSTRY.

DRAFT Regulations have been circulated by the Home Secretary, under the powers given by Section 79 of the Factory and Workshop Act, 1901, which it is proposed to substitute for the Special Rules at present in force for the protection of workers in mineral water manufactories. The dangers which beset such workers arise entirely from the bursting of bottles or syphons in the various processes to which they are submitted, and all the regulations are framed with a view to such bursting, except one which orders the provision of waterproof aprons and boots or clogs for persons working in processes which involve exposure to wet. Such changes as are made in the draft regulations as compared with the Special Rules, framed in 1898, are due to the changes in the system of manufacture since that date. For example, the wearing of face guards and gauntlets is no longer imposed upon all bottlers, because automatic filling machines now in general use prevent the escape of the fragments of a burst bottle.

WOUND OF THE KNEE-JOINT TREATED BY CLOSURE AND IMMEDIATE ACTIVE MOVEMENT.

WE described some time ago[1] an advance made during the war by Dr. C. Willems, a Belgian surgeon, who treated acute arthritis, principally of the knee, due to infected bullet wounds, by incision and drainage, followed by immediate active movement, with remarkable success. Although this treatment is contrary to the current teaching its rationale is simple: the movement expels pus and prevents adhesions. In the *Boston Medical and Surgical Journal* of Feb. 17th Dr. L. Allen has reported a case of lacerated wound of the knee-joint in a child which he treated in this manner. A boy, aged 5 years, fell on a broken bottle embedded in the ice, making a jagged cut about 3 inches long to the outer side of the patella, which opened the joint. He was 40 miles away, and his medical attendant telephoned that he was bringing him to hospital, and asking what should be done for first aid. Dr. Allen told him to paint the wound and its neighbourhood with tincture of iodine, and put on a sterile dressing. About five hours after the accident he enlarged the wound under ether, picked out all clots, trimmed all the edges and washed out the joint with 2 per cent. boric acid solution, using several quarts, and keeping his fingers out of the wound entirely. He closed the synovial wound with No. 00 interrupted catgut, sutured the capsule with interrupted No. 2 chromic catgut and kangaroo tendon, closed the skin wound with No. 00 catgut and continuous silkworm-gut and a few interrupted silkworm sutures, carried a small

[1] THE LANCET, 1920, ii., 81.

cigarette drain down to the capsule, and painted with tincture of iodine. Light sterile dressings were put on with the knee flexed and then extended so that movements could be kept up. The nurses were instructed to make the child flex and extend his knee to the full extent every two hours day and night, and to use passive movement if he refused. At first the child was afraid to move his knee, but he soon found that it was not painful, and a game was invented which encouraged him to do it. Healing took place by first intention. The drain was removed on the third day, and the sutures on the ninth and tenth days. The child was in bed eight days, and went home on the twelfth day. A report nine months after the accident shows that the joint is quite normal. This case is in strong contrast to one treated by Dr. Allen a short time before by the ordinary method. A young man had a bullet wound of the knee-joint. The treatment consisted in removing the bullet, débridement, drainage, and splint. He died from a streptococcic infection. The contrast is maintained on turning to Willems's results. In 100 cases, of which 18 were accompanied by purulent synovitis of a virulent type, chiefly streptococcic, he had no deaths and no amputations. There was one resection and only two stiff joints.

FOOD AND THE PEOPLE

A RECENT question addressed to Dr. Addison in the House of Commons asking what steps he was taking to alter war-time food substitutes, in view of their effect on the physique of the worker and his children, elicited the reply that substitutes such as margarine had generally been adopted by consumers for economic reasons, and, so far as he was aware, all staple articles of food were now freely available. The reply read somewhat as a disclaimer and misled us, along with others, into supposing that the Minister of Health was unable to offer the practical dietetic advice of which as a nation we stand so much in need just now, forgetting that—as appeared elsewhere in our columns—the issue of a pamphlet on these very matters had been foreshadowed by the Minister. It is, of course, well-nigh impossible for anyone to make general statements on food values which are not liable to be misconstrued. Professor Gowland Hopkins found this so early this year when his Huxley lecture, which we published in full, gave a section of the daily press occasion to bury "those d——d calories" along with all the carefully measured demands of the body which they represent and the slight intellectual effort required to appreciate them. After all, calories can be measured, while accessory food substances, until they have been isolated, cannot. We propose to spell "vitamin" in future without the "e" in order to avoid the appearance of spurious accuracy implied by the ending "ine," which should strictly now only be given to organic bases. When the researches being conducted jointly by the Ministry of Health and the Medical Research Council are completed, and the pamphlet follows, its issue will be very welcome.

ANÆSTHETICS FOR AN UNUSUAL PURPOSE.

THE National Anæsthesia Research Society, whose activities in America we have commented on with admiration on previous occasions, publish in their latest bulletin an interesting example of a novel use for anæsthetic administration. Hitherto what association there has been between anæsthetics and crime has been for the benefit of the criminal. Actually such an association is rare in real life, although very common in fiction. The novelists' criminal, we may remark *en passant*, when he employs chloroform has a positively supernatural skill in obtaining rapid results. The handkerchief appears to be applied to the victim's face one moment and the next he, or more often she, lies at the mercy of the administrator. The induction, moreover, appears to be as safe as it is rapid, for the victim always awakes. Anæsthetics have now been turned in real life against the criminal. They have been used to demonstrate the possibility of phonation on the part of a man accused of murder who steadfastly refused to utter a word for two weeks. The account presented[1] is not perfectly clear, but apparently the man was given nitrous oxide first, to what stage of narcosis we are not told, and then ether to the excitement stage. At this point he exclaimed loudly and the physician in attendance was satisfied that "he could have talked all along if he had so desired."

DELAYED REPORTS.

IN almost identical words do the Sanitary Commissioner for the Madras Presidency and the medical officer of health for the county of Gloucester deplore the failure of subordinate health officers punctually to submit their sectional reports. The delay in each case has impeded the preparation of the larger and more comprehensive report from which alone hygienic lessons can be drawn, with the result that these lessons are unduly held back. Reports for 1919 are still coming in, and it is difficult to believe that they have not lost their freshness for the wider public whom every active-minded medical officer of health hopes to reach. We have more than once dwelt on the official report as popular educator, and we hope that this view may be found to lighten what is too often regarded as mere clerical drudgery. Everyone cannot hope to write with the racy pen of some county medical officers, but all should bear in mind the educational value of a prompt and vivid report.

WE regret to announce the death of Dr. Henry Barnes, O.B.E., LL.D. McGill, consulting physician to the Carlisle Infirmary, and the author of well-known works on Cumberland medical topics.

AN Interim Report presented on April 12th by the King's Fund Policy Committee to King Edward's Hospital Fund for London recommends a careful inquiry to see whether the problem of voluntary hospital finance could be solved if the voluntary subscriptions of the charitable public were supplemented by a graduated system of patients' payments from those able to pay at the time of illness and by insurance on the part of those who are unable to do so, the hospitals agreeing to limit free treatment, except in emergencies, to those unable either to pay or to insure.

The Services.

QUEEN ALEXANDRA'S MILITARY FAMILIES' NURSING SERVICE.

THIS service, consisting of matrons, sisters-in-charge, and staff nurses, will take over the permanent nursing establishment of the military families' and military isolation hospitals. The rates of pay and pension will be the same as those laid down for the corresponding ranks in Queen Alexandra's Imperial Nursing Service.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Lieut.-Cmdr. (D.) E. E. Fletcher to be Surgeon-Commander (D.).

Surg. Lieut. J. B. Crawford to rank of Surgeon Lieutenant-Commander.

ROYAL ARMY MEDICAL CORPS.

Temp. Lieut.-Col. E. W. White relinquishes his commission and retains the rank of Lieutenant-Colonel.

Major W. Bvam relinquishes the temporary rank of Lieutenant-Colonel on reduction of establishment.

Temp. Major E. H. Marshall (Major, R.H. and R.F.A., T.F.) relinquishes his temporary commission.

Capt. and Bt. Major J. D. Kidd relinquishes the acting rank of Major.

Temporary Captains relinquishing their commissions and retaining the rank of Captain: E. J. Maxwell, J. A. Martin, R. H. Balfour-Barrow, P. G. Simpson, D. Evans, T. L. Davies, D. C. Smelzer, H. P. W. Lincoln, W. Pritchard-Airey, J. H. Whiteside, and A. G. Leitch.

ROYAL AIR FORCE.

Medical Branch.—A. F. Wright, A. E. Jenkins, and W. B. Wilson are granted temporary commissions as Flight Lieutenants. M. J. Cahalane, O. St. L. Campion, and S. E. Elphick are granted short service commissions as Flight Lieutenants.

The undermentioned relinquish their temporary commissions on return to naval duty: Wing Commander G. D. Bateman (Surgeon Commander, R.N.) and Squadron Leader A. R. Sharrod (Surgeon Lieutenant-Commander, R.N.).

[1] Current Research in Anæsthesia and Analgesia, Bulletin No. 9 March, 1921.

EXCESSIVE PRESCRIBING BY PANEL DOCTORS.

(FROM A LEGAL CONTRIBUTOR.)

WHILE it may reasonably be supposed that every practitioner having charge of a panel is more or less acquainted with the rules under which he carries out his duties, he is probably not very familiar with the decisions of the tribunal which is called upon to consider alleged breaches of the rules. They are not reported, like ordinary cases, in the daily press, and are only published at long intervals. The following notes set forth some general principles laid down in the cases which have been reported; the references are to two volumes of reports published in 1917 and 1919 respectively as Parliamentary papers.

The Drug Fund.

With respect to excessive claims upon the Drug Fund, Article 40 of the National Health Insurance (Medical Benefit) Regulations (England), 1913, is in the following terms:—

40.—(1) Where it appears to the Panel Committee that by reason of the character or amount of the drugs or appliances ordered for insured persons by any practitioner or practitioners on the panel, the cost of the supply of those drugs and appliances is in excess of what may reasonably be necessary for the adequate treatment of those persons, the Panel Committee may, and if any representations to that effect are made to them by the Pharmaceutical Committee shall, make an investigation into the circumstances of the case, whether in respect of the drugs and appliances ordered by an individual practitioner or generally as to the orders given for drugs and appliances by practitioners on the panel.

(2) The Panel Committee shall, after hearing the Pharmaceutical Committee and any practitioner concerned, make a report to the Committee, and if, after considering the report, the Committee are of opinion that an excessive demand upon the Drug Fund has arisen owing to orders given by a practitioner which are extravagant either in character or in quantity they may, if they think fit, make such deduction from the amount payable to that practitioner by the Committee as they think fit, and shall pay the amount so deducted to the credit of the Drug Fund: provided that the practitioner shall be entitled to appeal to the Commissioners, whose decision shall be final.

Appeals.

Appeals are dealt with by the Commissioners under the provisions of Article 51 of the Regulations, which empowers them either to decide the case without a hearing, or, if they think that a hearing is required, to authorise any two or more of their number to hear and determine the appeal. It is to be observed that the Panel Committee must make the investigation, and that they must listen to representations made by the Pharmaceutical Committee. All the cases which follow, except the last, were decided under Article 40; but it is important to notice that this Article was revoked and replaced by Article 9 of the Regulations made in 1916. Under this Article the Pharmaceutical Committee no longer takes any part in the proceedings; the Panel Committee may, if dissatisfied with the Insurance Committee's decision, refer the matter to the Commissioners, when both the Panel Committee and the practitioner concerned may be heard.

Notwithstanding this change, the following cases lay down some valuable principles. The Panel Committee may not delegate their powers. In one case the Panel Committee appointed five of their members as a subcommittee to investigate cases of alleged excessive prescribing, and the appellant was invited to attend, and attended a meeting of this subcommittee. He was not given an opportunity of appearing before the Panel Committee itself. It was held that the Panel Committee had no power under the Regulations to delegate to a subcommittee their duty of hearing the practitioner, and that the irregularity of procedure invalidated the Panel Committee's report.

It does not appear to be necessary that the Committee shall be satisfied by evidence on oath. They may apply their own knowledge and experience. In a case decided on March 16th, 1915, the Insurance Committee withheld money from the appellant on the ground that the quantities of lin. methyl. sal. ordered by him were excessive. The appellant, in a written statement addressed to the Panel Committee, had put forward the plea that the circumstances of the neighbourhood where his patients resided were such as to call specially for lin. methyl. sal. The Panel Committee, after considering this statement, recommended that money should be withheld from the appellant, and stated in their report that in arriving at this decision they had acted "on their knowledge as general practitioners as to the quantity likely to be necessary." It was held that on this point the Insurance Committee were entitled to accept the expert opinion of the Panel Committee as conclusive.

Statistical and Other Evidence.

There must, however, be evidence of some kind. Statistical evidence does not generally suffice, standing alone, to justify the inference of extravagance; but in conjunction with evidence derived from the character of the prescriptions themselves and in the absence of satisfactory explanation by the doctor, it may assist both in establishing the fact of extravagance and in enabling a reasonable estimate to be made of the additional cost thereby caused to the Drug Fund. But where statistical evidence is put forward and the practitioner fails to give an adequate explanation of a charge of extravagance, it may be sufficient. So where the cost of the appellant's prescriptions calculated on this basis as compared with the general average of the panel doctors' prescriptions on a similar basis is represented by a percentage of 214·4. The actual cost of the prescriptions for the period of six months was £58 13*s.* 9*d.*, and the number of persons on his list was 262. Having these figures before them, together with the other evidence referred to above, the Panel Committee reported that they found that there was evidence of general extravagance and unnecessary frequency in prescribing, and that they estimated the excess thus caused at 50 per cent. of the total cost of the prescriptions. The Insurance Committee, on the recommendation of their Medical Benefit Subcommittee, accepted this estimate and decided to deduct £29 6*s.* 10*d.* from the doctor's remuneration. The Commissioners reduced the deduction to £15, but stated that in so doing "they have acted on the view that the provision for a reduction is largely intended to be a deterrent, and have had regard to the fact this is the first occasion on which a charge of extravagance has been made and established against this practitioner."

A Concrete Example.

The following is a good example of what has been regarded as extravagant prescribing.

The average cost of the appellant's prescriptions for two quarters per insured person on his list was respectively 12·67*d.* and 8·59*d.* as compared with a general average for all practitioners on the panel of the area of 6·21*d.* and 5·83*d.* In addition to this and other statistical evidence, there was a report which showed that orders for malt and oil had been given by the appellant much more frequently than was warranted by the dosage which he himself directed. The Commissioners found that the Insurance Committee were justified in arriving at the conclusion that there had been extravagance and dismissed the appeal from a deduction of £21 13*s.* 3*d.*

In a case in which several panel doctors were concerned (Vol. I., p. 92) the Panel Committee had taken the view that the investigation by them of particular prescriptions would be an undue interference with the doctor's treatment of his patient. The Commissioners, however, stated that this view was inconsistent with the proper discharge of the Committee's functions under the Regulations.

It is not sufficient for a Panel Committee to invite a practitioner, against whom extravagant prescribing is alleged, to inspect his own prescriptions and give explanation; individual prescriptions which appear to indicate extravagance should be put to the practitioner.

A claim on the part of a practitioner to discuss with the Panel Committee seriatim the whole of his prescriptions (amounting to some three thousand) and to have the insured person for whom the prescription was ordered in attendance at the meeting was held unreasonable and not warranted by the Regulations. (Vol. I., p. 108.)

It should be mentioned that in the Scotch case of Mitchell *v.* The Insurance Committee of the Burgh of Aberdeen, (1918) 1 S.L.T. 316, Lord Salvesen decided that the Committee were not bound to investigate every case treated by the doctor.

The Panel Committee must not, however, act upon mere guess-work. Thus a procedure under which the Panel Committee invite practitioners on the panel, the cost of whose prescriptions exceeds a certain average sum, to submit to the deduction of one-fourth of the excess, involves the substitution of a mechanical process for a proper investigation into individual cases, and is open to criticism on this ground. (Vol. I., p. 101.)

The practitioner, however, must be prepared to rebut a charge of extravagance. So where in the opinion of the Panel Committee as a body of medical practitioners the use of certain drugs appears *primâ facie* to exceed what is reasonably necessary for adequate treatment, it is not a sufficient answer for the practitioner concerned to say he honestly thought them necessary.

It has also been held that it is dangerous for a doctor to ignore the proceedings of the Panel Committee, for it has been held that a doctor who declines to attend the meeting of the Panel Committee at which his prescriptions are discussed does so at his own risk, and it does not lie with him to take an objection on appeal, if the Panel Committee's report in consequence appears less conclusive than would otherwise be the case.

A distinction is drawn between "active" drugs and those which are used for flavouring, &c. In one case (Vol. I., p. 112) the Commissioners laid it down that the question of the legitimate use of sweetening and flavouring agents is one of degree and proportion. The view adopted by the Panel Committee, that the latter drugs cannot be placed in the same category, therapeutically, as "active" drugs, and that a reasonable moderation should be observed in their use, was approved.

The panel doctor sometimes has occasion to call in a consultant. If the consultant orders expensive drugs it does not necessarily follow that the expense will be allowed. The Commissioners have decided (Vol. I., p. 116) that the fact that a particular preparation has been recommended by a consultant does not divest the panel doctor of his ordinary obligations, and he cannot justify the prescription merely by reference to the consultant's advice; but the recommendation is a circumstance of which account must be taken in deciding whether the preparation was reasonably necessary for the adequate treatment of the patient.

As to proprietary medicines, it has been held that the use of such articles costing more than the B.P. preparations, though justifiable in exceptional cases, cannot be supported merely on the ground that the patients preferred the article. The view that the patient's judgment is to be the criterion of the necessity for the use of particular medicines would involve a dangerous abdication by medical practitioners of their professional responsibilities.

The question of the latitude to be allowed to a doctor's individual preference in methods of prescribing was considered in relation to an alleged excessive use of liquor morphinæ. The Commissioners decided, in the absence of evidence that the insured persons on the appellants' lists differed from those on the lists of other doctors, that the use of a drug such as liquor morphinæ in 75 per cent. of the scripts issued by one of the appellants could only be held reasonably necessary on the assumption that all persons who are not being treated on such methods are deprived of adequate treatment.

In another case a doctor, according to the report of the Commissioners, had "made extensive use in his practice of two proprietary articles—namely, ferro-glidine, stated to be a preparation of iron especially devised to secure easy assimilation; and iodex, a preparation of iodine in the form of an ointment, said to possess the advantages of being rapidly absorbed and of not staining. On careful consideration of the full evidence given as to the relative advantages of these preparations and of other preparations of iron and of iodine respectively, which might have been used for the same objects, we are not satisfied that many, at all events, of the patients treated by the use of these remedies could not have been treated with equal benefit, and at much less cost, in other ways." The Commissioners, however, made it plain that what they objected to was the routine use of these articles.

The individual discretion of the doctor must not be unduly interfered with. Thus, in deciding whether particular drugs are "reasonably necessary," due allowance must be made for the personal element, and within reasonable limits a doctor should be allowed to follow methods of treatment most congenial to him. But the exercise of individual judgment does not necessarily lead to the use in all cases of more expensive forms of treatment, and if a proneness to use more expensive drugs is coupled with a very high average cost, strong evidence would be required to show that the high cost is due solely to the conscientious exercise of a discriminating judgment.

NOTES FROM INDIA.

(FROM OUR OWN CORRESPONDENT.)

MADRAS CONSULTATIVE HEALTH COUNCIL.

THE Consultative Council of Public Health, the members of which were announced a few weeks ago, met for the first time on Feb. 12th at Fort St. George. At a previous meeting of the Board of Health suggestions had been made to divide up the Consultative Council into six committees, each committee to be responsible for a specified group of subjects. It was felt that in this way the Consultative Committee would be able to deal more efficiently and more speedily with the many problems which it would have brought to its notice. At its first meeting the Consultative Committee agreed to the formation of the following committees: (1) the Committee for Education and Research; (2) the Committee for Administration; (3) the Committee for Preventive Medicine; (4) the Committee for Water-supply, Drainage, &c.; (5) the Coördination Committee; (6) the Housing Committee.

Scope of the Sectional Committees.

The first Committee, consisting primarily of professional men, but including also a district board president, a sanitary officer, and an educational officer, would deal with such subjects as medical schools and colleges and their extension, location, curricula, &c., and the training of all classes of sanitary officers from medical officers of health downwards. The possibility of a Provincial Research Institute would also come into its purview, along with determination of standards.

The Committee for Administration would deal with matters connected with medical institutions, such as the standardisation of equipment, buildings, the provision of emergency wards in dispensaries, the important matter of itinerating dispensaries, and hospital accommodation for infectious diseases, whilst it would also deal with conditions of service of sanitary officers and the expansion of nursing and midwives' service. The members of this committee, with the exception of the Surgeon-General, are presidents of district boards and chairmen of municipal councils, but at least one sanitarian may also be considered essential.

The Preventive Medicine Committee, of which the Surgeon-General is chairman, deals with epidemic diseases like cholera, small-pox, plague, malaria, and the investigation of the history and periodicity of epidemics in South India is perhaps one of the most urgent questions which will arise.

The fourth Committee deals with the all-important problems associated with water-supply and drainage, and if it can hasten by a day some of the large schemes which have been held up for so long in the Madras Presidency it will have justified its creation.

The Coördination Committee has a difficult part to play. It will endeavour to coördinate the work of local bodies *inter se*, and to enlist voluntary agencies, delegating specific services to them and demarcating spheres of work, whilst encouraging the formation of district committees of public health. It will also have much to do with maternity work, as well as inspection of school children. But its most important duties will be in organising voluntary aid.

The Housing Committee will deal with civic surveys, town-planning schemes, coöperative buildings, &c., and its personnel comprises engineers, sanitarians, municipal chairmen and voluntary workers, along with the new director of town planning, and the chairman of the Madras City and Suburban Trust. Some of these committees have already met, and as most of the members are also members of the Legislative Council, when these several questions arise in the House they will be able to guide the Council.

An Ambitious Programme.

To indicate the work undertaken by these committees mention may be made of some of the resolutions passed by the Committee for Coördination at its first meeting. These include the following:—

(1) Recommended that the committee interview the Council of the Health and Welfare Association regarding the coördination of various associations, and (2) recommended that voluntary associations should be asked what they can do in the way of undertaking the following services: (*a*) maternity and infant welfare, (*b*) propaganda work, (*c*) ambulance and first-aid, (*d*) utilisation of students, boy scouts, and girl guides in public health, (3) recommended that the functions of the District Committee of Public Health should comprise provisionally the following:

(*a*) organisation of a district health service, (*b*) duplication of medical staff in order to bring medical relief within reach of rural populations, (*c*) to establish a record of the history and periodicity of epidemic disease within its jurisdiction.

No one will deny that this is an ambitious programme in itself, but it is only a fraction of what requires to be done, and it is to be hoped that some real benefit will accrue to public health in South India from the work of the Consultative Council.

Report of Sanitary Commissioner.

The Sanitary Commissioner's Report for 1919 has recently been published. As the Government remarks, "the utility of the report is greatly impaired by its late receipt, and the failure of certain local authorities to submit their returns punctually is unsatisfactory." The report covers a wide range of subjects.

In every district the birth-rate is markedly below the average for the five years ending 1918, and although defective registration is the cause assigned, the Government does not altogether accept this view and considers that the Sanitary Commissioner should endeavour by intensive examination in selected areas in each district to arrive at some coefficient of error to decide to what extent, if at all, the statistical decline in birth is real. A curious commentary made by the Board of Revenue is quoted—viz., that the registration of vital statistics is less satisfactory in areas where it is compulsory than in areas to which compulsion has not been extended. Public health in 1919 was under all heads much better than in 1918, and the death-rate in many districts was below the average for the previous five years. At the same time a very considerable number of districts and municipalities showed a very high death-rate, and there seems little doubt that influenza continued during 1919 to take its toll of victims over large areas in the Presidency.

Infantile mortality throughout the Presidency is appallingly high, and, as Government remarks, "does not reflect credit on local self-government." In Madras City, in spite of the child-welfare scheme which is now three years old, the rate is 332 per thousand, whilst the Presidency average is 246·2. Cholera accounted for 93,262 deaths, but so long as the provision of protected water-supplies is so backward—45 out of 74 municipalities having no protected supply—it is very unlikely that cholera will be effectively controlled. Moreover, nothing is known of the history and periodicity of the disease even in those areas most susceptible to infection, and this aspect of preventive work must receive attention before any definite policy can be laid down in regard to the protection of water-supplies.

Plague deaths totalled 5645, against 12,859 in 1918, but it is suggested that a more comprehensive programme of preventive measures should be drawn up, including intensive rat destruction, the provision of rat-proof godowns, &c.

General sanitation and conservancy are defective, and few municipalities are provided with a sufficiency of public or private latrines. Of 16 posts sanctioned for health officers only four are filled, as medical men are very reluctant to accept service under municipal councils. Even men qualified as sanitary inspectors avoid service under local bodies if they can get other employment, and this is not surprising when one is acquainted with the complete lack of interest taken in public health even by the more advanced local bodies.

Madras, March 17th.

HUNGARY.

(FROM OUR OWN CORRESPONDENT.)

The University of Kolozsvár (Klausenburg) in Budapest.

As Kolozsvár, the capital of Transylvania, has been in Roumanian territory since the Treaty of Versailles, the University of Kolozsvár (the Francis Joseph University, so named because it was erected at the private expense of the late King of Hungary), has been taken over by the Roumanians in the second half of the 1919–20 school year. The name of the University and the language in which lectures are delivered have been changed. Several professors have been asked to take the "oath of faith," which would have enabled them to retain their positions on the understanding that they learnt Roumanian, after which they would be required to lecture in that language. Most of the lecturers have, however, refused to take this oath, preferring to run the risk of dismissal. Numerous professors and lecturers have voluntarily left Kolozsvár (Roumania) and have repatriated themselves by coming to Budapest. At the latter city it was a very difficult matter to house the university suitably in view of the great scarcity of available accommodation. The offices of the rector and dean have been placed in the building of a "middle school," but various university institutions are now scattered over the whole city. The great distances to be traversed between them cause serious difficulty in the working of the university, which at present contains 600 students. It is intended to move the university to Szeged or Debretzin. The former city (population about 150,000) has offered two palaces for the buildings, and has guaranteed suitable accommodation for all members of the staff, in addition to promising contributions towards maintenance, amounting to several million kronen. A decision will be reached by the university authorities in September.

A Professor's Relations with Bolsheviks.

In the autumn of last year the Hungarian Government issued an order that investigations should be made into the behaviour of public officials during the period of Bolshevik rule in Hungary. University professors and lecturers have also been considered as public officials, and those found to have shown Bolshevik tendencies were discharged from their positions. After these investigations had been held there appeared in a Budapest daily paper an article headed "Dr. Emil Gross, the Bolshevik University Professor." In this article the professor (who is well known in England, having been president of the Hungarian Section of the International Medical Congress in London in 1913) was seriously slandered. He was said to have erected marble tablets in his clinic to commemorate the visits of princesses who consulted him during the war, but to have taken them down during the Bolshevik revolution. The article also contained the indictment that Professor Gross offered his professional services to Bela Kun, the Bolshevik dictator, as his family doctor. Professor Gross, as a university man, was empowered by the Minister for Public Instruction to take legal proceedings against the writer of the article. The case was heard and the journalist who was responsible for its publication said that it was the work of a medical student, who confessed to having written it, but stated that he had given it to the journalist to edit and confirm the contents before publication. The article had appeared as it was written, however, and the journalist was sentenced to 60 days' imprisonment for calumny and fined the sum of 1200 crowns.

An Interesting Case of Medical Secrecy.

One day during March a venereal diseases specialist, seated in the large warm-water basin in the antechamber to the steam hall of the Turkish baths at Debretzin, recognised in a young man who was about to enter the water one of his own patients who had consulted him two weeks previously for an extensive syphilitic sore on the penis. The physician had ordered him calomel ointment, and, knowing that the sore could not be healed, got out of the water, went up to his patient, and whispered to him that he must not enter the basin on account of his chancre. The man told him that the chancre was already healed, whereupon the doctor remarked that he declined to sit with him in the same basin, and that he would summon the manager of the baths if the other persisted in entering the water against his advice. As the patient refused to comply with the request the specialist sent for the manager and explained matters to him. The latter pointed out that the rules of the public baths prohibited men with wounds, skin diseases, &c., from entering common baths. The young man thereupon dressed himself, went away, and consulted another specialist, who gave him a written certificate that on that day his sore had healed, leaving only a hard infiltration. The young man sued the doctor for trespassing the medical secrecy laws, but lost his case, the court decreeing that the specialist only carried out his professional duty, being right to presume that the chancre had not healed in so short a time, and acting in the interests of the community in so doing.

Persecution of Jewish Students at Budapest University.

A few days ago some women students, believed to be Jewesses, being seated in the front at a lecture by Dr. Paul Háry, professor of physiological and pathological chemistry, were ordered by certain male students to move to the back benches. The incident was reported in a morning paper, and on the following day, after a lecture, a student rose and declared that until the newspaper article had been withdrawn or corrected Jewish students would not be admitted to the lectures. No correction, naturally, did appear, for the article had contained only the truth. The door of the Institute of Physiological and Pathological Chemistry was barricaded against Jews, who were told they would only gain admission by revealing the name of the writer of the article. Professor Háry finally came and persuaded the men concerned, who belonged to the Anti-Semitic Union of University Students, to desist from such measures against their comrades, and undertook to find out who made the matter known to the press, promising to express his reprobation of this publication of the internal affairs of the University.

Foreign Bodies in the Stomach.

In Szombathely a commercial clerk, 19 years of age, recently sought the advice of a club doctor for pains in the stomach; on palpation the latter diagnosed a tumour and sent him to hospital, where X ray examination revealed the presence of material, probably metal, which gave a large shadow. Dr. Peto extracted at the operation 43 wire nails, 3½ inches in length, together with 20 pieces of lead of the same length as the nails. Finally he found among the intestines the blade of a penknife. The aggregate weight of these objects amounted to more than 500 grammes. After being awakened from narcosis the man was asked how the foreign bodies came to be in his stomach, but said he did not know how he could have swallowed them. His relatives stated that he was mentally unbalanced and excessively religious; they thought it probable that he swallowed the objects during his periods of exaltation.

URBAN VITAL STATISTICS.

(Week ended April 9th, 1921.)

English and Welsh Towns.—In the 96 English and Welsh towns, with an aggregate population estimated at 18½ million persons, the annual rate of mortality, which had been 13·9, 13·0, and 13·0 in the three preceding weeks, fell to 12·5 per 1000. In London, with a population of 4½ million persons, the death-rate was 13·4, or 0·2 per 1000 above that recorded in the previous week, while among the remaining towns the rates ranged from 4·1 in Acton, 6·3 in Ilford, and 6·4 in Edmonton, to 17·1 in South Shields, 17·2 in Halifax, and 17·5 in Oldham. The principal epidemic diseases caused 228 deaths, which corresponded to an annual rate of 0·6 per 1000, and comprised 64 from infantile diarrhœa, 57 from diphtheria, 52 from whooping-cough, 38 from measles, 14 from scarlet fever, and 3 from enteric fever. Whooping-cough caused a death-rate of 1·5 in Burnley, and diphtheria of 2·5 in Exeter. The deaths from influenza, which had been 151, 122, and 130 in the three preceding weeks, fell to 97, and included 38 in London and 5 in West Ham. There were 3453 cases of scarlet fever and 2626 of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital, against 3535 and 2689 respectively at the end of the previous week. During the week ended April 2nd 5 cases of encephalitis lethargica were notified in the County of London, and comprised 2 in Wandsworth, and 1 each in Camberwell, Paddington, and St. Pancras. The causes of 32 of the 4454 deaths in the 96 towns were uncertified, of which 7 were registered in Birmingham, 6 in London, and 3 in South Shields.

Scottish Towns.—In the 16 largest Scottish towns, with an aggregate population estimated at nearly 2½ million persons, the annual rate of mortality, which had been 17·8, 15·3, and 15·5 in the three preceding weeks, fell to 15·1 per 1000. The 343 deaths in Glasgow corresponded to an annual rate of 16·3 per 1000, and included 27 from whooping-cough, 3 from infantile diarrhœa, and 2 from scarlet fever. The 122 deaths in Edinburgh were equal to a rate of 14·3 per 1000, and included 3 from infantile diarrhœa, 2 from measles, and 1 each from whooping-cough and diphtheria.

Irish Towns.—The 154 deaths in Dublin corresponded to an annual rate of 19·0, or 0·2 per 1000 below that recorded in the previous week, and included 4 from infantile diarrhœa, and 1 each from enteric fever and scarlet fever. The 130 deaths in Belfast were equal to a rate of 16·1 per 1000, and included 9 from whooping-cough, 3 from measles, and 1 each from enteric fever and infantile diarrhœa.

Public Health.

ANNUAL REPORTS OF MEDICAL OFFICERS OF HEALTH.

COUNTY OF DERBY.

Dr. Sidney Barwise makes some interesting remarks on the subject of the prevention and treatment of tuberculosis in his annual report for 1919. In common with most parts of England, there has been in Derbyshire during the previous few years an increase in the number of cases of tuberculosis and deaths resulting from the disease. The number of notifications and deaths respectively from all forms of the malady were in 1915, 990 and 557; in 1916, 1098 and 552; in 1917, 1146 and 621; in 1918, 1123 and 667; and in 1919, 1176 and 525. During the last 30 years, however, the death-rate from pulmonary tuberculosis in the county has declined much more rapidly than in England and Wales as a whole.

If any real advance is to be made in the prevention and treatment of tuberculosis, those engaged in the work should have in mind the many unsolved problems connected with the disease and take every opportunity of increasing our knowledge of the subject by observation and inquiry concerning aspects of the question that still remain obscure. As a result of study of the literature, Dr. Barwise gives an excellent synopsis of the more modern views, and allusion may be made to certain of the points discussed by him. Tuberculosis is the most widespread of diseases; it accounts for 10 per cent. of all deaths in England and Wales. It is widely distributed throughout the world. In America it is more common amongst the negroes, although it was almost unknown amongst them while they were in slavery. After the blacks, the Irish suffer most in America, while the incidence of the disease among the Jews is relatively small. Among the North American Indians tuberculosis was unknown while they were uncivilised. In 1896 half of certain tribes had been exterminated, in spite of a birth-rate of 41 per 1000. In nine reservations 66 per cent. of the deaths were from tuberculosis.

A few years ago the generally accepted view was that phthisis was due to inhalation of tubercle bacilli in dust from dried sputum, and that over 50 per cent. of glandular and abdominal tuberculosis was due to the consumption of milk containing the bovine type of the tubercle bacillus. Investigations on the portals of entry into the body of the specific micro-organism have modified our views on this subject. It is probable that the risk of infection from dried sputum is not very great. A leading authority, F. M. Pottenger, has recently described tuberculosis as primarily a disease of the lymphatic system, and there is a considerable amount of evidence in favour of the view that the tubercle bacillus gains access to the body through the tonsils or intestine. The droplets sent out in coughing by a person in certain stages of the disease are probably one of the chief sources of infection. Walsham, in 1903, called attention to the tonsil and the cervical glands as a common channel of entry. He found that in 34 consecutive post-mortem examinations on the bodies of patients who had suffered from tuberculosis, the tonsils were infected in no less than 20. Beattie and Dixon express the view that the commonest mode of entry in the human subject—except in the case of young children—is by way of the tonsils, and perhaps in some cases by way of the teeth. The bacilli pass to the cervical glands, and into the lungs by way of the peri-bronchial lymphatics. From the root of the lung the path of infection may be outwards and upwards, involving the apex of the upper lobe, or it may spread fanwise and involve the pleura. There is now fairly general agreement with Sanarelli's view that man only survives by having acquired immunity as a result of a mild attack of tuberculosis early in life. Support is, of course, given to this view by the large proportion of bodies showing either active or healed manifestations of the disease at

post-mortem examinations made upon persons who have died from other causes.

Having discussed many of the problems in connexion with the transference of the malady Dr. Barwise makes a few practical suggestions on the public health application of the lessons learned. The improvements necessary in housing are better ventilation, better facilities for washing, better places for storage of food. The efforts of health visitors should be concentrated on preventing infection during the first few years of life. The child should not be allowed to crawl on the kitchen hearthrug, but have a clean washable crawling rug, and its hands and face must be washed before each meal. If infected during the first year of life the result is almost always fatal, and children should be removed from tuberculous mothers, as Bang, of Copenhagen removed the calves from tuberculous cows. Again, the campaign against tuberculosis in cattle must be proceeded with, and until milk is available from certified tubercle-free cows, that given to infants under two years of age must be sterilised. We must remember, however, that the child has to acquire immunity. It cannot always be kept wrapped up in cotton-wool. After it has reached the age of 2 years, it should, in Dr. Barwise's opinion, take its risk in acquiring immunity through a localised tuberculosis by allowing it occasional small doses of the ordinary milk of commerce.

COUNTY OF GLOUCESTER.

In presenting his annual report for the year 1919, Dr. J. Middleton Martin again refers to the difficulty experienced in obtaining from the district medical officers of health copies of their annual reports within a reasonable period of the end of the year under review. Many of these were sent to the county council at a very late date, thus impeding the preparation of the annual report for the county as a whole.

The number of births registered in Gloucestershire during 1919 was 5275, giving a rate of 16·4. This is the largest figure since 1916, and there is a distinct tendency toward a return to pre-war rates, though the recovery is as yet by no means complete. On analysis of the figures it is found that, when comparison is made with 1917, which was the year of lowest birth-rate, there has been an increase of only 9 per cent. in legitimate births and of 30 per cent. in illegitimate births. In rural districts the increase in legitimate births is as low as 5 per cent., and the corresponding figure for illegitimate births is 53 per cent. The total death-rates in both urban and rural districts are the lowest recorded since 1914. The rate for the whole county was 14·0, as compared with 13·8 for England and Wales. The statistics for 1919 show that influenza was again responsible for an unusually large number of deaths (335), though for by no means so many as in 1918 (849). Bronchitis was the cause of death in 319 cases, as compared with 234 in 1918, 292 in 1917, and 293 in 1916. The number of deaths ascribed to heart disease was 670, which is the maximum recorded, though not greatly above the numbers for 1917 and 1916, which were 652 and 650 respectively. The number of deaths from pneumonia was 222. From pulmonary tuberculosis it was 235, as compared with 329 in 1918 and 361 in 1917.

RHONDDA URBAN DISTRICT.

Dr. J. D. Jenkins's annual report for the year 1919, though not yet restored to its pre-war dimensions, contains much interesting material relating to the health and sanitary circumstances of the district. The general death-rate for the year under review was 13·1 as compared with a rate of 15·9 in 1918, and an average rate of 14·4 for the previous 10 years. The zymotic death-rate of 0·7 is the lowest for the last 30 years, and is less than half that of the previous year. The infantile mortality-rate was 111, which is rather higher than that for the two previous years. Housing is one of the chief public health problems in this district. The tendency to overcrowding which existed before the war has since become much emphasised. It is probable that 1200 tenements give lodgement to more than two persons per room. As a result of inspection of over a fourth of the houses in the district within recent years it may be stated that between four and five thousand houses intended for the accommodation of single families have become occupied by two or more families per house. Overcrowding is steadily increasing owing to the dearth of houses, and it is estimated that it will be necessary to erect approximately 1000 houses a year to remedy the existing unsatisfactory state of matters in this respect. The majority of existing houses are comparatively new, commodious, and generally fairly well built of native Pennant sandstone, but the number provided with baths forms a small minority. The defects found in the houses that have recently been inspected were, for the most part, in the nature of general dilapidation attributable to inattention or neglect during the war years and consisting of defective walls, roofs, doors, and windows, insufficient or broken yard-paving, and dilapidated sanitary conveniences. Even before the war difficulty was experienced by owners of property in obtaining skilled labour, and this, of course, became progressively greater and ultimately insurmountable during the war years. The position was further aggravated by the increase in the price of building material and by the restrictions imposed upon its purchase. Having regard to these difficulties the Rhondda urban district council, under the provisions of the Housing Acts, 1890 to 1919, have decided to undertake themselves to a greater extent than formerly, the repairs of houses not in all respects reasonably fit for human habitation in instances where the owners fail to comply with the requirements of notices served upon them. Information concerning 115 such houses has been lodged with the surveyor to the council, whose department is entrusted with the work, which is now proceeding in three portions of the district simultaneously.

COUNTY BOROUGH OF BIRKENHEAD.

In the preface to the annual report for 1919 Dr. D. Morley Mathieson, who was appointed as medical officer of health of this county borough on the death of his predecessor, Dr. Sidney Marsden, makes reference to the circular issued by the Ministry of Health in January, 1920, in which it is stated that a survey in annual health reports of existing conditions and arrangements is specially needed at the present moment—

> "to form the basis of that careful and comprehensive scheme of health developments generally which it is hoped may shortly follow, in every locality, upon the recent unification in the Ministry of Health of the various central functions in respect of all matters affecting the health of the people; since this unification of the central administration implies and, indeed, cannot be effective without a corresponding coördination of local health activities."

Dr. Mathieson thinks that the Ministry's pronouncement will be welcomed as indicating a new policy and that it will have the effect of encouraging each local authority to look upon its health problem as a whole. This means getting away from the sectional view that the health of an infant, the health of a child attending school, the health of a tuberculous workman, the health of an expectant unmarried mother, are quite distinct problems calling for separate staff, isolated premises, and different methods. It means realising that all these and many other sides of public health work are essentially one, and that only when the machinery for dealing with them is gathered into one central workshop, and, so to speak, driven off the same shaft, can fully coördinated results be obtained.

Birkenhead occupies an area of 3850 acres, or about six square miles, and is the largest borough in Cheshire. In 1881 the population of the borough was 84,006; in 1891, 99,857; in 1901, 110,915; in 1911, 130,794, and the Registrar-General estimates the population in 1919 for the death-rate at 148,052, and for the birth-rate at 154,226. During the year 3385 births were registered, giving a birth-rate of 21·9 per 1000. There were 2067 deaths and the death-rate was 13·9. The infantile mortality-rate was 102 per 1000 births.

Miss Ruth Darwin has been appointed a Commissioner (unpaid) of the Board of Control.

Correspondence.

"Audi alteram partem."

PREVENTION OF HEART DISEASE.

To the Editor of THE LANCET.

SIR,—The leading article under this title in your issue of April 9th regrets that while much work is being done on the clinical side of heart disease, the preventive aspect is comparatively neglected, and you commend to us the "thoroughgoing campaign" directed towards prevention and inaugurated in America. Doubtless your advocacy will command general sympathy, but at the best any practical outcome from it will be delayed. In the meantime we must utilise the measures which are at hand. Hence I repeat once more the proposal that the recognition of rheumatic events in any member of a family ought to be an occasion for warning parents of the risks run by their children even from apparently slight illnesses. The mischief in a large proportion of cases of cardiac disease is effected during the non-arthritic forms of rheumatism—tonsillitis, chorea, febricula, &c. Parents do not know this truth, and only when they know it will they realise the importance of giving their children early and complete rest in the disturbances just named. Were this early and complete rest generally practised there is at least a chance that many children would be saved from the terrible misfortune of organic heart disease. The responsibility rests with the medical profession, and it can be discharged by the universal adoption of the course here proposed. For the "national campaign" we needs must wait. But the individual practitioner has his opportunity here and now, and though it does not pretend to heroic possibilities it lies in the line of duty and is not without the promise of reward.—I am, Sir, yours faithfully,

Harley-street, W., April 12th, 1921. C. O. HAWTHORNE.

TREATMENT OF PSEUDO-DIPSOMANIA.

To the Editor of THE LANCET.

SIR,—Although probably every practitioner meets with cases of alcoholism in his practice, it does not appear to be universally recognised that in practically all such cases the only possible course is complete and total abstinence. I have come across so many of these unfortunate patients who have been advised to take one or two glasses a day and no more, with invariable failure, that I venture to write in the hope of saving some of the others from a like fate.

It cannot be too generally known that no case of pseudo-dipsomania (drinking in bouts) can, as a rule, take a single glass without craving following, and that whilst the individual who is liable to chronic alcoholism can for a short time take alcohol in moderation, it is utterly impossible for him to do so for any length of time. It is true that some pseudo-dipsomaniacs require a comparatively large amount of alcohol to start an attack, and that some of these habitually take beer with their meals without an attack, though in every such case which I have seen their period of immunity has been ended by their taking whisky. But in both these two forms total abstinence is the only possible line to take to avoid relapse. It is more difficult to speak with confidence regarding the true dipsomaniacs, who get attacks of craving at regular or irregular intervals, whether they take alcohol or not. Some of them can drink in moderation between their attacks. Some can be radically cured—the only form of alcoholism which can, though few have so far recovered.

In certain cases the attacks always end with a heavy discharge of urates, and I have found that in a few of these a bottle of Contrexéville taken every day for three days running every fortnight, and a saline purgative once a week will keep off attacks for long periods. Six such patients treated in this way have remained well for over six years, one of them who suffered for over 20 years having had no relapse for eight and a half years. In others repressions of various kinds seem to be the acting cause, and cure follows when they are unearthed, either by hypnosis or psycho-analysis. Many of them unfortunately suffer from pseudo as well as true dipsomania, and, of course, in such cases total abstinence is a sine qua non.

Nothing is more pathetic than the struggle against hopeless odds which these unfortunate patients undergo when trying to follow the well meant but fatal advice to take only a limited amount. It is impossible. Their only choice lies between total abstinence and drinking in excess. I am, Sir, yours faithfully,

Welbeck-street, W., April 6th, 1921. HUGH WINGFIELD.

BROMISM THROUGH MATERNAL MILK.

To the Editor of THE LANCET.

SIR,—With reference to an annotation appearing in THE LANCET of April 9th, under the above title, the notes of the following case, which occurred in my practice, may be of interest.

A breast-fed infant of 5 weeks was seen by me on April 11th, 1912, on account of a rash on the face and scalp which began as a single spot on the left cheek on April 4th, and by April 8th had spread over the face and scalp. On April 11th there was a papulo-pustular eruption on the face and scalp, each spot being round, raised on an inflamed base, and covered with a fairly thick dark crust. Most of the places were the size of a threepenny-bit, but three on the scalp were the size of a sixpence. The rash seemed to give the patient pain. Otherwise the child seemed to be perfectly well. The temperature was, and continued to be, normal. On April 13th there was a spot exactly similar to the above on the left wrist. The eruption seemed to me to be a typical bromide rash and difficult to account for, the child being breast-fed. Inquiry, however, elicited the fact that the mother had been taking a mixture of pot. brom. 3 iss aq. ℥vi. in one table-spoonful doses thrice daily for ten days before the first appearance of the rash and until April 11th. The mother was duly instructed to avoid taking the drug. On the 24th there was a fresh crop of spots similar to the previous, and due apparently to the fact that the mother had, contrary to instructions, been taking the bromide mixture again since the 17th. The diagnosis was confirmed on the 20th by the opinion of a well-known dermatologist who saw the patient, but no examination of the mother's milk for the discovery of bromine was made. Recovery was not complete until the middle of June. A noteworthy feature of the case was the fact that the dose of bromide was only gr. viiss. taken thrice daily for ten days before the first appearance of the rash.

The character of the eruption was exactly that which is not infrequently seen in infants who are taking bromide as medicine by the mouth, but previous to this case it had not fallen to my lot to see a case where bromism had been produced apparently by administering bromide to the nursing mother.

I am, Sir, yours faithfully,

Streatham, S.W., April 9th, 1921. HARRY E. SMITH.

THE DIPHTHERIA SWAB ON DISCHARGE.

To the Editor of THE LANCET.

SIR,—There seems to be some confusion between the financial and clinical value of the diphtheria swab on discharge. If the cost is not considered, I do not think anybody would maintain that we should not obtain information from any method that may be available, and in this connexion it is well to remember that a positive result has a clinical as well as an administrative value, in enabling treatment to be directed to the infected area. When in charge of the Manchester City Fever Hospital I found that many diphtheria convalescents had positive noses and negative throats, and that the attention thus directed to the nose enabled one to adopt useful measures for ridding the patient of the bacilli. Surgical treatment, both in the throat and nose, was often necessary and successful.

Financially, the cost of the examination of 200 swabs in a central laboratory costs less than the hospital treatment of one return case. I do not think anyone will deny that—as pointed out by "M.O.H." in your last issue—the swabbing of convalescents does sometimes diminish the incidence of return cases, and in my own

experience this influence was both beneficial and well marked. The bacteriology can be done more *cheaply* by an assistant medical officer of health because he is not paid much—if at all—for the work, but the advocates of this procedure do not always seem to realise that something more than a microscope and appropriate stains are necessary. It is in the preparation and accurate standardisation of media that the central laboratory has the advantage.

I am, Sir, yours faithfully,
A. KNYVETT GORDON, M.B.

Bedford-square, W.C., April 9th, 1921.

THE FIGURES OF VENEREAL DISEASE.

To the Editor of THE LANCET.

SIR,—My fault. I am sorry. The increase of 23,000 V.D. cases was "at the London hospitals," not "at the London Hospital." I misread my brief.

I am, Sir, yours faithfully,
KNUTSFORD.

April 9th, 1921.

VENEREAL INFECTION IN RHINE ARMY.

To the Editor of THE LANCET.

SIR,—In a letter of mine you recently published (March 26th) I showed how very much better the American Forces in Germany were in their control of venereal infection than were the British Forces. The American rate I quoted was for the period January–October, 1920—viz., 142 per 1000 per annum. This rate has now been considerably reduced, and for the period Nov. 1st, 1920, to April 1st, 1921, the American rate is 114 per 1000 per annum. The lowest rate officially stated for the British Forces is 168 per 1000 per annum for the period Jan. 1st, 1920, to Jan. 31st, 1921, and the highest rate, quoted semi-officially, is that given by Dr. E. B. Turner in November last—viz., 500 per 1000 per annum.—I am, Sir, yours faithfully,

ETTIE A. ROUT,
Late Hon. Secretary, New Zealand Volunteer Sisters.

April 11th, 1921.

THE VALUE OF THE QUASI-CONTINUOUS TEMPERATURE RECORD.

To the Editor of THE LANCET.

SIR,—Since our paper on the Value of the Quasi-Continuous Temperature Record in the Early Diagnosis and Prognosis of Tuberculosis appeared in THE LANCET of March 19th we have received a number of inquiries as to how we take these temperatures—one as to whether it is not very disturbing to the patient to have his temperature taken at such short intervals. May we point out that the method of taking these temperatures was described in THE LANCET of Feb. 5th and 12th, 1916, and that the records published in our last paper are simply in continuation of work begun some eight years ago? The thermometer used—a rectal thermometer—is left in position for 24 hours or more (the patient lying in bed), except when the patient has to use the night-stool. One of us lay in bed with the thermometer in position for the greater part of six weeks. All aver that they experience no inconvenience even when the thermometer is left in situ for several days. The process of recording the temperature is purely mechanical and automatic.

We are, Sir, yours faithfully,
G. SIMS WOODHEAD.
P. C. VARRIER-JONES.

Cambridge, April 11th, 1921.

A CONTROLLED STUDY OF SANATORIUM RESULTS.

To the Editor of THE LANCET.

SIR,—If all investigations and trial of new methods of treatment were carried out with such patience and control as Dr. E. Ward has shown in his article in your issue of March 12th, it would be better for all concerned—viz., the patients, the doctors, and the State. Dr. Ward, who may be supposed to have begun his work with a prejudice in favour of sanatorium methods, has published his conclusions with a candour that is convincing. My own experience distinctly supports his experience. It is to be hoped that his article will be read by the lay enthusiasts who have been misled by the lay press, and especially by members of county councils and insurance committees, who can hardly listen to a suggestion that sanatoriums have failed to do a tithe of what was promised. I cannot help thinking that if much of the money which has been spent on sanatoriums had been used to enforce by-laws regarding fresh air and sunlight in cottages we should have had better results.

I am, Sir, yours faithfully,
S. NOY SCOTT.

Plymstock, April 6th, 1921.

A FATAL CASE OF CŒLIAC INFANTILISM.

To the Editor of THE LANCET.

SIR,—Dr. R. Miller, in presenting in your issue of April 9th the view of cœliac disease that he supports, might, I think, have referred to the fatal case published by Dr. Hugh Paterson and myself in THE LANCET, 1914, i., p. 1533, under the title, "The Occurrence of Ascites of a Non-tuberculous Origin in Chronic Recurrent Diarrhœa in Childhood." I believe it to be in this country the first complete proof by necropsy of a clinical sign which is well recognised in the cœliac affection, though perhaps hardly yet generally appreciated. Ascites is so intimately associated in our minds with abdominal tuberculosis in childhood that its occurrence in a wasting disease with diarrhœa tempts us strongly to decide that the condition must be tuberculous. The completion of the proof of its non-tuberculous nature is thus, I think, worth a reference in a paper dealing with the necropsies upon cases of cœliac disease. It is of some interest that a widespread leucocytic infiltration of the intestinal walls and pancreas was found in this case as in the one criticised by Dr. Miller in his paper. There is no doubt that Dr. Miller has made a valuable contribution to the subject by publishing his case, which was investigated by a skilled pathologist; whether his conclusion that the disease is "a digestive fault" independent of organic affection is correct the future must decide, though in my opinion he does not gain by ruling out cases described by others which he had no opportunity of seeing himself. My experience of cœliac disease has been that it may appear suddenly in classical type or follow upon a definite entero-colitis; it may be complicated by a subsequent entero-colitis or by serious constipation with great atony of the bowel. Is it "independent" of organic change? Possibly; but I still think we require more research upon the subject, and prefer to suspend my judgment.

I am, Sir, yours faithfully,
F. JOHN POYNTON, M.D.

Devonshire-place, W., April 9th, 1921.

LUNACY IN EGYPT.

To the Editor of THE LANCET.

SIR,—I notice that in THE LANCET of March 12th, p. 553, under this heading there appears the statement that "at Khanka are received the more quiet patients and no women, a rather special class." As this statement may give a wrong impression of the type of cases admitted nowadays to Khanka Hospital for the Insane, may I point out that the classes of cases received at the two Egyptian hospitals for the insane are as stated on p. 3 of the report under review:—

"Abbassia Asylum receives all female cases, all criminal cases, all paying cases, and male cases arising in Cairo. Khanka Asylum receives all non-criminal pauper male cases arising in Egypt except in Cairo."

Thus the cases admitted to Khanka Hospital include all types of insanity among men.

Prior to 1917, owing to deficient means of communication, Khanka Hospital only received cases transferred from Abbassia Hospital, but since that date patients are received direct from their homes. The admissions at Khanka Hospital, therefore, comprise all types of insanity occurring amongst the population of Egypt similar to male asylums in other countries.

I am, Sir, yours faithfully,
H. W. DUDGEON,
Director, Khanka Hospital for the Insane.

March 31st, 1921.

CORPORAL PUNISHMENT IN SCHOOLS.

To the Editor of THE LANCET.

SIR,—The report of the joint conference of the Medical Officers of Schools Association with representatives of educational associations in your issue of April 2nd (p. 699) contains an inaccurate summary of my speech. I am there represented as stating that I "used two-hour periods of detention, which had resulted in corporal punishment becoming obsolete, not because it was not wanted, but because there were persons who could not be trusted with it." The inference would naturally be made that there were persons (presumably masters, though here the headmaster is the only person who may inflict corporal punishment) of the kind referred to, in this school. That is not so. What I said was (1) that I hoped that corporal punishment *generally* would eventually become obsolete, because I had heard of or come across persons in the course of my experience (both masters and "prefects") who were not fit to be trusted with the power of inflicting it; (2) that the weekly two-hour periods of detention, available only for house masters (acting on their own behalf or on reports made by class masters) have so far resulted in corporal punishment becoming unnecessary. It still remains in reserve as a final resort.—I am, Sir, yours faithfully,

GUY KENDALL,
Headmaster, University College School,
April 10th, 1921. Frognal, Hampstead.

TREATMENT OF DISABLED SOLDIERS: WORK OF THE MINISTRY OF PENSIONS.

To the Editor of THE LANCET.

SIR,—There are some members of the medical profession who are not in the way of treating disabled soldiers, but who will be interested to hear what is done for their treatment and recovery by the Ministry of Pensions, whose good work for the disabled is, besides, not sufficiently made known to the public, who only hear the complaints that are made, made often without sufficient cause. A soldier who becomes unfit for service is "boarded," a sailor is "invalided" and discharged as permanently unfit. The board fills up a treatment card for him if it thinks good, and when he returns to his home he is visited by an emissary of the Local War Pensions Committee, and is put in touch with the person or institution which can give him the treatment required. If the board has found he requires no treatment just now, but yet a little later he becomes uncomfortable and complains to his Local War Pensions Committee, it has him examined by a local medical man on behalf of the Pensions Ministry, who, if he finds the trouble is the consequence of a disability contracted in the service and due thereto, will get for him the treatment that his condition needs, medicine, appliances, massage, electrical or sanatorium treatment, or he may send him to a pensions hospital should indoor treatment be required. The pensions hospital is a large well-staffed and well-equipped institution. I have one now in mind which had 600 beds established in an emergency hospital built for the war on the sunny slope of a hill in charming surroundings. It had a medical superintendent with some eight other officers resident, and a dozen visiting specialists in surgery, medicine, X ray, ear, eye, massage, electrical, and so on, each of whom had a well-equipped department at his control; the nursing is done by the Ministry of Pensions Nursing Service, and, if I may judge by the cleanliness of the wards and the evident care of the nurses dealing with disabled patients, the work of that Nursing Service is very well performed. Officers and other ranks are received, and so far as possible cured. But more is attempted than physical cure. Reconstruction is also a prominent aim. There are workshops and schools. Men are trained as basketmakers, carpenters, mechanics, tailors, shoemakers, bookkeepers, photographers, painters, &c. They are taught how to raise and care for fowls and other farm stock. There is a capital splint-room and a workshop for making artificial limbs. They cannot be doing work all the time, they have their prescribed treatment as their first duty; the man you see as you pass with his forearm in the whirlpool hot bath would have been found, had you come in the afternoon, in the shoemakers' shop, and so on. Insane patients are not received, but there are wards for consumptives, well isolated. The men, who wear their own clothing, not uniform, appeared well-fed and happy, the staff were cheerful and good natured, there was a good recreation-room with a small stage, and a clean, well-kept dining-room. The public would be satisfied if it knew how much thought and care is being given to the treatment and reconstruction of its disabled heroes, and I recommend others to do, as I have just done, and see over one of these centres.

I am, Sir, yours faithfully,
March 29th, 1921. D.SC.

Obituary.

J. HOPKINS WALTERS, M.R.C.S. ENG.

IN Dr. J. Hopkins Walters, who died at Reading on March 4th, at the age of 76, there passes a notable character. Dr. Walters was educated at Guy's Hospital and practised during his earlier days at Faringdon, Berks. In 1878 he moved to Reading, where he speedily became one of the leading practitioners in the town—a position which he held until his retirement in 1913. He was on the active surgical staff of the Royal Berks Hospital from 1879 to 1904, and subsequently was appointed consulting surgeon. He was President of the Reading Pathological Society for two years. In his younger days he was a keen sportsman and good shot; he also took a great interest in the Volunteers, in which for many years he was a surgeon-captain. In local politics he was prominent, sitting for a considerable period on the Reading Town Council, where he was a formidable adversary in debate and prompt in action. Temperamentally a fighter, he was not afraid of stating his views, often original and always founded on reason, in vigorous and, at times, picturesque language. Dr. Walters, though of the older school of medical men, was readily receptive of new ideas, and up to the time of his retirement was more up to date than most practitioners of his years. Even after he relinquished active practice in Reading he made a voyage half-way round the world as ship's surgeon. On the outbreak of war he volunteered for various posts which the authorities, on account of his age, were unable to grant him, and he eventually acted as medical officer to the regiment quartered in the town and to two V.A.D. hospitals. He was a good speaker and a versatile writer, both in the medical press and as a controversialist in lay journals.

On the eve of his death he had seemed in better health than usual, and, indeed, played a game of billiards at his club. Death occurred suddenly in his sleep, as he had always desired—he was ever impatient of illness in himself. Like all able men of his type, he had some enemies and very many friends.

CHARLES ALBERT HINGSTON, M.D., B.SC. LOND.

Dr. C. A. Hingston's death at Plymouth on April 5th removes a well-loved practitioner who was also a wise and generous philanthropist. Son of the late Dr. Charles Hingston, he was born at Plymouth in 1843, and after being educated locally, entered as a student at St. Bartholomew's Hospital, London, and matriculated at the London University. On graduating M.B. in 1864 he joined his father in partnership, taking his M.D. and B.Sc. degrees a year later. His public appointments included that of consulting physician to the Plymouth Public Dispensary and Dental Dispensary, and physician to the Ear and Throat Hospital, Plymouth, and to the Devon and Cornwall Female Orphan Asylum. Dr. Hingston was particularly interested in the Y.M.C.A. movement and did much to put its local branch on a firm financial basis, presiding himself over the South-Western District of the Association. He made himself responsible for building the Crownhill Convalescent Home, and he expended some £5000 on a lodging-house for tramps. He will be much missed in and around Plymouth.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

The Medical Committee of the House of Commons.

THE Medical Committee met on April 11th at the House of Commons. The following resolution was put and passed unanimously:—

That the medical Members of the House of Commons express their cordial appreciation of the services of the Right Honourable Christopher Addison, M.P., as Minister of Health, and congratulate him on the excellent work he has done as the first Minister in the face of many difficulties. They wish to place on record their admiration for his zeal and devotion to duty, and his untiring work in the interests of public health.

The Public Health Officers (Security of Tenure) Bill was discussed, and the Committee decided to lend it their support. The Coroners Bill was considered, and it was decided that when this Bill reached committee a new clause should be moved to increase the fees paid for post-mortem examination and medical evidence. The Tuberculosis Bill and the Health Estimates were then considered. The Dogs Bill was discussed, and opposition to it was agreed upon unanimously.

Public Health (Tuberculosis) Bill.

On Wednesday, April 13th, Sir A. MOND (Minister of Health) moved the second reading of the Public Health (Tuberculosis) Bill, a measure the object of which is to transfer the institutional treatment of tuberculosis from the National Health Insurance Commissioners to the County and Borough Councils. The Bill was read a second time.

HOUSE OF COMMONS.

TUESDAY, APRIL 5TH.

The Case of Dr. Denning.

Mr. MONTAGU, Secretary for India, in reply to Mr. T. GRIFFITHS, said that the new Reform Act now in force in India in no way affected the pre-existing right of a British-born subject to sue for breach of contract for personal service in India. Contracts for service under the Government of India were made with "the Secretary of State in Council." Such subject would presumably sue the Secretary of State in Council in respect of a breach either in India or in this country. The action could be brought in India or in this country, according to circumstances. The position would remain unaltered in so far as an officer certified by the India Office Medical Board to be incapacitated for further service in India was not regarded as necessarily entitled to know the medical grounds on which such a certificate was given. Such contracts were not subject to the will and pleasure of the Crown, except that the Crown had in law the right to dispense with the services of its officers, and it would not be in the power of the Secretary of State in Council, or of a Government in India, to alter the law in this respect, or to limit this right of the Crown when entering into such contracts. The Secretary of State in Council would remain the authority for the recruitment of those services which were now known as "all-India services"—such as the Indian Civil Service, the superior police service, the Indian Educational Service, and so forth—and consequently would remain the contracting parties for these. Recruitment in this country of Services, the members of which were not to be appointed and controlled by provincial governments, would probably be made over for the most part to the High Commissioner for India, and he would necessarily, subject to instructions he received from the authorities in India, for whom he was acting, have power to contract on their behalf, but in the name of the Secretary of State in Council. It would, therefore, still be open to officers like Dr. Denning to sue the Secretary of State in Council.

WEDNESDAY, APRIL 6TH.

Local Rates and Public Health.

Colonel BOWLES moved "That a Select Committee of the House of Commons be appointed to inquire into the incidence of local rating by public authorities and to make a report." The present Prime Minister, he said, when Chancellor of the Exchequer in 1911, set up a Departmental Committee on local taxation, and that Committee reported that since the time of the Royal Commission, which reported in 1904, the following expenses had been placed on the rates: National Insurance for Tuberculosis Sanatoriums, provision of meals for scholars, provision for medical inspection in schools, asylum officers' superannuation, &c. Since 1911 there had been a great many further demands upon local authorities for the Mental Deficiency Act, the Venereal Disease Act, &c. He felt that it was rather hopeless for him to attempt to indicate exactly what line the Government should take in this matter. He understood, however, that the question was receiving the attention of the Government, and he hoped that it would be dealt with promptly.

Lieutenant-Colonel Sir A. WARREN, in seconding the motion, pointed out that if the business of the House had followed the course set down, there would have been a discussion on the previous day on the second reading of the Public Health (Tuberculosis) Bill which was a measure to transfer the institutional treatment of tuberculosis from the National Health Insurance Commissioners to the local authorities of the country. It was estimated that the additional services under the Bill would involve expenditure out of public funds of £40,000, of which £20,000 was to be met by the Exchequer, and £20,000 from the rates. Why should this expenditure be put on the rates? Surely if there was one question that could be regarded as eminently national it was the white plague, tuberculosis. In his opinion the time had come when the question of the rates had got to be seriously considered, and when some measure of protection had to be set up for the unfortunate ratepayers throughout the country.

Mr. MYERS said the Labour Party would support the motion, but for perhaps quite different reasons from some of those which had been already advanced. The present method of assessment in respect of local rates was very largely antiquated and out of date. Take a professional man—a medical man, solicitor, architect, or a man of that kind. He occupied perhaps very small premises in a side street, and made, say, £1000 a year. The business man making a like sum was mulcted in rates out of all proportion to what the professional man had to pay, and there was no equity in an arrangement of that character. In every Act of Parliament that came through the Ministry of Health or any of those departments that had to deal with local government more and more calls were being made on the local authorities. In 1914 the average rate per head of the population in England and Wales was £1 18*s.* 11*d.*; in 1919 it was £2 5*s.* 1*d.*, an increase in five years of 6*s.* 2*d.* per head. In the same period the Government grants were: In 1914 an average per head of the population of 12*s.* 4*d.*; and in 1919 15*s.* 1*d.*, or an increase of 2*s.* 9*d.* He suggested that at the present time local rates had nearly reached breaking point, in so far as they were imposed upon houses and similar property. He held the view that one of the sources of new revenue that they had got to tap was the taxation of land values. The Government themselves had reached a point when they were trying to impose upon local authorities for the purpose of reducing the rates a very undesirable policy, which in the long run would operate both against the local authorities and the community as a whole. The two circulars which had reached the local authorities from the Ministry of Health and the Board of Education were nothing less than a public scandal, and they moved in the direction of national suicide. To attempt to economise upon education and public health for the purpose of keeping down the rates in his judgment bordered on national imbecility, and no House of Commons ought to countenance or encourage the general principles which underlay those two circulars.

Major GRAY said it was useless for the local ratepayer to expect much sympathy from that House when he would not make the least effort at elections to see that fitting persons were returned to take part in the work of local government.

Sir A. MOND (Minister of Health) said when they looked at the increase in the rates in this country from a total sum of £71,000,000 for 1913-14 to £149,000,000 for the financial year just ended, the figures were apt to stagger one, but they had to consider the fact that the value of money had very much diminished. It was not really the case that the reason for the increase in the rates was to be found in the number of large and heavy burdens which had recently been imposed on local authorities by new legislation. The real cause was of a much more normal and automatic character. The new work which had been imposed upon local authorities by health developments—in regard to tuberculosis, venereal disease, maternity and child welfare—did not amount to more than a 2½*d.* rate throughout the country. Not that he felt that new services, even of small amounts, should lightly be thrust upon local authorities at the present time. As Minister of Health, it was his firm intention to endeavour to avoid all unnecessary expenditure in the very difficult financial circumstances in which they now found themselves. Good strict administration and the application of the best intelligences in localities to their own affairs would do more in the long run for increased efficiency and lower rating than any juggling with local taxation. He had not yet had time to go fully into the matter, but a strong Cabinet Committee had been appointed by the Prime Minister to take up the question with the purpose and intention of introducing legislation next session. He thought they would proceed more quickly on those lines than by appointing a Select Committee.

After further discussion the House divided, and the motion was negatived by 49 votes to 48. The result was received with laughter.

Royal Naval Hospital at Yokohama.

Commander BELLAIRS asked the Secretary to the Admiralty whether the Admiralty could take steps to abolish the Royal Naval Hospital at Yokohama as a needless source of expense.—Mr. AMERY replied: The Royal Naval Hospital at Yokohama is required for the reception of convalescent cases from Hong-Kong to remove them from the period of hot and damp weather experienced there. Its abolition would result in a larger number of cases being invalided home from the China station with the consequent inconvenience and expense. I am therefore unable to agree with the view of my honourable and gallant friend that the hospital is a needless source of expense.—Commander BELLAIRS: Is my honourable friend aware that though this hospital has something like 80 or 90 beds in the year 1920 not a single patient was accommodated, and the maximum number accommodated in recent years was only eight; and is it not ridiculous to have such expense maintained?

Mr. AMERY: I noticed those figures, and was struck by them, but I understand that the reason was that the hospital was not open last year at the time when patients from Hong-Kong are usually sent there; but I will inquire further into the matter and see if any economy can be effected.

Dr. Addison's New Post.

Mr. CHAMBERLAIN (Leader of the House), replying to Major KELLEY and Major C. LOWTHER, said that the Minister without portfolio received a salary of £5000 per annum. He had attached to him two civil servants drawn from the Ministry of Health. He would discharge duties analogous to those performed by Sir L. Worthington-Evans and Mr. G. N. Barnes when they held a like post. In the present pressure of public business there was definite need for a Minister of Cabinet rank unburdened by departmental duties, and the work of his colleagues in that capacity was most valuable. No time had been fixed for the duration of the appointment.

Financial Aid for the Hospitals.

Colonel MILDMAY asked the Minister of Health whether he was taking any action, in accordance with the recommendations of the Interim Report of Lord Cave's Committee, with reference to the disposal, in the interests of hospitals, of the surpluses of Approved Societies.—Sir A. MOND replied: A copy of the Report has been sent to every Approved Society with a covering letter, in which the society is urged to give its serious consideration to the question of using part of its disposable surplus (if any) in making payments towards the cost of the treatment of its members in hospitals. The right honourable and gallant Member is, of course, aware that this is only one of many additional benefits which it is open to societies to provide.

Education of an Epileptic Child.

Sir BURTON CHADWICK asked the President of the Board of Education whether he was aware that the local education authority for Barrow-in-Furness, after having tried without success to obtain a place for an epileptic child in England, had now obtained a place for that child in a certified school in Scotland; whether the Board of Education had declined to sanction contribution towards the maintenance of that child on the ground that they were precluded by law from authorising such contribution; whether, if the Board had so declined, the legal ground on which the objection was made was that the certified institution willing to receive the child was in Scotland; and whether, the Board having stated that they recognised there was at present no vacancy in any certified school in England, it was possible for the authority, under the extraordinary condition, to contribute to the educational training and care of this child in a certified school in Scotland pending a vacancy arising in a certified school in England.—Mr. FISHER replied: The institution to which the honourable Member refers is not a certified special school, and is not recognised by the Scottish Education Department. The answer to the second part of the question is in the affirmative. A local education authority in England and Wales is precluded under Section 2 of the Elementary Education (Defective and Epileptic Children) Act, 1899, from educating an epileptic child in an institution not certified by the Board.

Dr. Denning's Contract.

Mr. ROBERT RICHARDSON called the attention of the Secretary of State to the stricture of a judge on the form of contract relied upon by the plaintiff in Denning *v.* the Secretary of State for India and asked whether he was aware that in certain respects the new form of contract was open to similar criticism.—Mr. MONTAGU replied that assurance had been given by the Attorney-General that the judge's remarks would receive attention, and pointed out that the new contract differed from the old in stating more explicitly that services may be terminated on account of medical evidence.

Mr. THOMAS GRIFFITHS asked the Secretary of State for India whether he was aware that Dr. Denning contended that the medical evidence, upon which his contract of service had been prematurely terminated, was wrong in fact and false in deduction, inasmuch as, while the position of the India Office was that Dr. Denning had developed cardiac disease after an attack of malaria in India, his condition was consequent on rheumatic fever at the age of 14, and was present when he was passed for service in India. Further, Dr. Denning declared that an eminent medical specialist considered that functional efficiency was not impaired.—Mr. MONTAGU replied that while Dr. Denning alleged that his condition was present in 1909 when he was passed for service in India by a medical board, he (Dr. Denning) at that time had signed a specific declaration that to the best of his knowledge and belief he was not afflicted with any form of disease.

Mr. SPOOR asked the Secretary for India whether the main difference in the new and old forms of contract for service in India was to make it clear that the officer served at the will and pleasure of the Crown, but that the new form of contract contained no provision safeguarding a civil servant against injustice through departmental blunders; and whether he would consider the advisability of arranging for future cases of dispute to be referred to an independent tribunal, and so avoid departmental mistakes inadvertently ruining the careers of able men and losing their services to the Indian Empire.—Mr. MONTAGU replied: The relevant point of difference between the present form of contract and that which was in use in 1909 is that the present form states explicitly a condition, which in the earlier form was contained by reference to the Civil Service Regulations—namely, that service may be determined by reason of medical unfitness on the report of a duly constituted advisory medical board. I do not understand the honourable Member's references to departmental blunders and mistakes and do not consider it necessary to insert any provision purporting to safeguard a civil servant against their occurrence nor to take the action suggested in the second part of the question.

THURSDAY, APRIL 7TH.

Cost of Pensions Administration.

Lieutenant-Colonel ASSHETON POWNALL asked the Minister of Pensions what was the total spent by his Ministry on central administration, local committees, in his estimates for 1921–22; and what proportion such administrative expenses bore to the total sums disbursed in pensions.—Mr. IAN MACPHERSON replied: In the Ministry's estimates for the year 1921–22 provision is made for the sum of £4,386,000 for cost of administration. The sum is made up as follows: headquarters and regional establishments (other than medical), £3,052,000; local committees, £1,334,000. The total sum is approximately 4 per cent. of the amount disbursed in pensions, allowances, and treatment.

Discharged Soldiers and Heart Disease.

Mr. RAPER asked the Minister of Pensions if the sum of £46,000 had been saved in pensions and grants to discharged soldiers suffering from heart disease; and what was the nature of the medical discovery by means of which this saving was effected.—Mr. IAN MACPHERSON replied: I have no knowledge of the figure referred to in the first part of the question. A sum of nearly £4,000,000 a year is at present being paid to men who are pensioned for heart disease. Every effort is being made by the establishment of cardiological clinics with improved methods of diagnosis and treatment to restore the health of men who suffer from this complaint.

Medical Care Allowances for Veterans.

Mr. WILLIAM GRAHAM asked the Minister of Pensions whether his attention had been directed to the hardship of men disabled in former wars being denied treatment allowances for their dependents during the period of medical care in connexion with their disablement; whether such treatment allowances for dependents were accorded to men disabled in the late war, although they had married after disablement; and whether it was proposed to continue this distinction against veterans and others disabled in former wars.—Mr. IAN MACPHERSON replied: The warrants and regulations of the Ministry of Pensions make no provisions for the medical treatment of men disabled in former wars, and it is only in exceptional cases that a man would need treatment at this date for a disability incurred so long ago. The question has, however, recently been raised in connexion with certain tropical diseases and is now under consideration.

Washington Maternity Convention.

Mr. CLYNES asked the Prime Minister whether, in view of the importance of the Washington Convention on Maternity, and also of the opinion that the Draft Convention of the Washington Conference must be submitted to Parliament, an opportunity would be given at an early date to discuss the Government's policy on the convention, and also the Ministerial declaration that it was for the Government to decide whether any particular convention should be submitted

to Parliament.—Mr. LLOYD GEORGE replied: In view of the great pressure of Parliamentary business, I regret that I cannot at the present time make any definite arrangements for such a discussion, and I must remind my right honourable friend that it formed the subject of a discussion on March 22nd.—Mr. CLYNES: If the Prime Minister cannot at present give an assurance for an early date, can he assure us that if things improve in the next week or two he will reconsider it?—Mr. LLOYD GEORGE: We will consider it afresh; yes.

Motor Traffic Regulations.

Mr. ALFRED T. DAVIES asked the Minister of Transport whether his attention had been called to the urgent need for codifying and simplifying the numerous regulations for motor traffic; whether any representations on the subject had been made by the police authorities; and whether he would consider the practicability of issuing such a codification of the regulations at an early date.—Mr. ARTHUR NEAL (Parliamentary Secretary to the Ministry of Transport) replied: I would refer my honourable friend to the answer given on Feb. 24th to the honourable Member for Wallsend relating to the matters at present under consideration by the Departmental Committee on the Regulation of Road Vehicles. I am sending a copy of this answer to my honourable friend. My right honourable friend the Minister of Transport is awaiting a further report from the committee before taking any steps to promote legislation.

Salaries of Ministry of Health Secretaries.

Lieutenant-Colonel Sir FREDERICK HALL asked the Minister of Health what was the salary and other emoluments paid respectively to the Secretary to the Ministry of Health and the Second Secretary on the appointments originally being made; what was the date of such appointments; what were these officers being paid at the present time; and was it contemplated making any increase either in their salaries or in any other manner in the near future.—Sir A. MOND replied: The salary and bonus of the First and Second Secretaries of the Ministry of Health when the appointments were originally made were respectively: First Secretary, salary £2000, war bonus £300; Second Secretary, salary £1700, war bonus £300. The date of these appointments was July 1st, 1919. The present salaries and bonuses are as follows: First Secretary, salary £3,000, war bonus £500; Second Secretary, salary £2200, war bonus £500. These increases in scales of salary are, of course, not confined to the Ministry of Health, but were approved by the Government for that and other large Departments of State in pursuance of the Report of the Committee (Mr. Asquith, Sir James Maclay, and Lord Colwyn) appointed to advise on the salaries of the principal posts in the Civil Service. The answer to the last part of the question is in the negative.

Stafford Asylum Officials.

Mr. JAMES WILSON asked the Minister of Health if his attention had been drawn to the action of the visiting committee of the Dudley Board of Guardians in threatening to dismiss two of its officials at the Stafford Asylum for writing to the local press; and whether he will make representations to the guardians concerned on the matter.—Sir A. MOND replied: My attention has not previously been drawn to this case, but I will make inquiries and communicate the result to the honourable Member.

Standard for Unsweetened Condensed Milk.

Mr. GRATTAN DOYLE asked the President of the Board of Trade if he was aware of the proposed standard for unsweetened condensed milk being about 12½ per cent. below the minimum cream contents recommended by the great weight of evidence heard by the subcommittee appointed by the Minister of Health; whether this was against trade interests in this country; whether it would tend to increase unemployment here; whether he was aware that the standards proposed by the condensed milk industry, manufacturers, importers, and the trade in this country were based upon the description officially given to this article in the public Chemists' Report for many years; and whether he would use his influence with the Minister of Health to fix a reasonable standard which could be met by producers in this country, and which importers should be required to reach if they desired to trade here.—Sir PHILIP LLOYD-GREAME replied: I am aware that the proposed standard for the minimum cream contents in unsweetened condensed milk is lower than that recommended by English makers, but I am unable to accept the various suggestions made by my honourable friend. In determining the proposed standard, consideration had to be given, not only to the interests of British manufacturers, but to those of other sections of the trade, and still more to the necessity of maintaining at competitive prices adequate supplies for the requirements of the country.

MONDAY, APRIL 11TH.

Air-space in Dartmouth Dormitories.

Mr. RAWLINSON asked the Secretary to the Admiralty the minimum amount of cubic air-space per boy allowed in the dormitories at Dartmouth next term when the proposed number of 589 cadets came into residence; and whether the Admiralty had been advised by their medical advisers that the amount of cubic air-space per boy was inadequate, and that in their opinion the reception of 589 cadets at Dartmouth would lead to overcrowding, and would be dangerous to the health of the cadets.—Mr. AMERY replied: Reliable information is not available as to the minimum amount of cubic air-space allowed in any one particular case, as this necessarily depends upon the configuration of the dormitories and the arrangement of the beds. The number of boys at Dartmouth during the summer term, however, is not now expected to be more than 585, and this number allows of an average of about 750 cubic feet for each boy. The variation in the different dormitories is likely to be small. While this average is slightly below what would be considered desirable in normal circumstances, the amount allowed can, in the opinion of the Admiralty, be accepted for the summer term, when the amount of ventilation possible is greater than in the winter months. For the autumn term the average amount of air-space per boy will be increased to over 800 cubic feet. The dormitories at Dartmouth are better situated than those at Osborne, as they are not on the ground floor.

Institutional Treatment of Tuberculosis.

Mr. TREVELYAN THOMSON asked the Minister of Health the number of county and county borough councils which had made arrangements for the institutional treatment of non-insured tuberculous persons in their areas, and the number which had not made such provision for non-insured persons.—Sir A. MOND replied: 143 of the 145 county and county borough councils in England and Wales have made arrangements for the institutional treatment of non-insured tuberculous persons, but in one case the provision so far made only extends to dispensary treatment.

After-care Committees for Tuberculous Persons.

Mr. TREVELYAN THOMSON asked the Minister of Health the number of county and county borough councils for which he had approved schemes for the appointment of after-care committees for dealing with insured and non-insured tuberculous persons in their areas.—Sir A. MOND replied: The schemes of 27 county and county borough councils for the appointment of committees of this kind have been approved by the Ministry of Health or their predecessors.

Accommodation at Hong-Kong Hospital.

Commander BELLAIRS asked the Secretary for War the maximum number of patients that could be accommodated at the Hong-Kong Military Hospital; what were the maximum and minimum numbers accommodated in 1920; and what arrangements were made elsewhere, if any, for convalescent patients.—Sir L. WORTHINGTON-EVANS replied: The maximum number of patients that can be accommodated at the Military Hospital, Hong-Kong, is six officers and 160 other ranks, but only four beds for officers and 122 beds for other ranks are at present equipped. The highest number of patients accommodated on any one day during 1920 was 64 in May and the lowest number was 25 in December. I am not aware of the arrangements at present existing for convalescents in Hong-Kong, but inquiries are being made. Prior to the war the sanatorium barracks were used as a convalescent centre.

Public Health (Officers) Bill.

Sir P. MAGNUS introduced a Bill "to amend the law relating to the tenure of office of medical officers of health, sanitary inspectors, and inspectors of nuisances, and for other purposes." The Bill was read a first time.

TUESDAY, APRIL 12TH.

Child Adoption.

Mr. NEVILLE CHAMBERLAIN asked the Secretary for the Home Department whether he had yet received the Report of the Departmental Committee on Child Adoption, presided over by Sir Alfred Hopkinson, K.C.; and whether the Report would be published.—Mr. SHORTT replied: The answer to both parts of the question is in the affirmative.

Criminal Law Amendment Bill.

Viscountess ASTOR asked the Prime Minister whether, in view of the wide support throughout the country accorded to the Bishop of London's Criminal Law Amendment Bill, he could give an assurance that the Government intend to adopt it and to introduce it into the House of Commons at an early date.—Mr. CHAMBERLAIN (Lord Privy Seal) replied: I can only say at the present time that if I find that this Bill can be treated as a non-controversial measure, the Government will endeavour to facilitate its passage towards the end of the session.

Government Health Policy.

Mr. TREVELYAN THOMSON asked the Prime Minister whether the recent change in the post of Minister of Health indicated any variation in the Government's policy with regard to health and housing administration; and could

local authorities which had undertaken the erection of dwelling-houses under The Housing and Town Planning Act, 1919, rely upon the Government fulfilling in the spirit as well as in the letter the promises made to them by the late Minister of Health with regard to their financial commitments.—Mr. CHAMBERLAIN replied: Undertakings given by the Government are not affected by changes of individual Ministers and the Government have no intention of departing from any pledges given to local authorities with respect to financial commitments entered into by them with the approval of the Ministry of Health.

Costs of the Denning Case.

Mr. THOMAS GRIFFITHS asked the Secretary for India whether he was now in a position to state the cost to the country of the legal proceedings in Denning *v.* Secretary for India, and of the time and incidental costs of India Office officials in resisting Dr. Denning's claim; and, if so, would he state the money paid out in respect of legal proceedings, the estimated cost incurred by the officials, the moneys paid to Dr. Denning, and the loss of income alleged in his statement of claim.—Mr. MONTAGU replied: The costs of the legal proceedings incurred by the Secretary of State in Council were £703 18*s.* 3*d.* As stated in answer to the honourable Member's question on March 2nd the Secretary of State in Council also paid £500 to Dr. Denning on account of the latter's costs. These sums are chargeable to Indian revenues. There was no expenditure in respect of the time and incidental costs of India Office officials. The loss of income alleged in Dr. Denning's statement of claim was £2728, including allowances.

Salaries of Health Insurance Officers.

Viscountess ASTOR asked the Minister of Health whether the scale of salaries for health insurance officers in the Ministry of Health, which was formerly £80 to £200 for men and women alike, had now been altered to £80 to £250 for men and £80 to £180 for women; and, if so, in view of the intention of the Sex Disqualification (Removal) Act, would he reconsider this.—Sir A. MOND replied: The differentiation of salaries is as stated in the question, and follows the recommendations of the Civil Service National Whitley Council Reorganisation Committee's report of February, 1920, which apply to the whole Civil Service in respect of the clerical class, with which class the Health Insurance officers have always been associated. Women appointed before the change in scales will continue to rise to a maximum of £200.

BOOKS, ETC., RECEIVED.

AMERICAN SOCIAL HYGIENE ASSOCIATION, New York.
The Sex Factor in Human Life. A Study Outline for College Men. By T. W. Galloway, Ph.D. Pp. 142.

CHAPMAN AND HALL, London. J. WILEY, New York.
The Chemistry and Analysis of Drugs and Medicines. By H. C. Fuller, B.S. Pp. 1072. 55*s.*
Œdema and Nephritis. By Dr. M. H. Fischer. 3rd ed. Pp. 922. 55*s.*
Qualitative Analysis and Medicinal Preparations. By H. C. Fuller, B.S. Pp. 192. 12*s.* 6*d.*

CONSTABLE AND CO., London.
Radiographic Technique. By T. Thorne Baker, A.M.I.E.E. Pp. 196. 15*s.*

DAVIS, F. A., COMPANY, Philadelphia.
Optimistic Medicine, or the Early Treatment of Simple Problems Rather than the Late Treatment of Serious Problems. By a former Insurance Man. Pp. 318.

HEINEMANN, W., London.
Man's Descent from the Gods; or the Complete Case Against Prohibition. By Anthony M. Ludovici. Pp. 254. 14*s.*
An Atlas of Normal Labour. By G. D. Robinson, M.D. Lond. Pp. 104. 15*s.*

HOLDEN AND HARDINGHAM, London.
Thoughts of a Nature Lover. By K. Rogers. Pp. 125. 5*s.*

KEGAN PAUL, TRENCH, TRUBNER, AND CO., London. DUTTON, E. P., AND CO., New York.
The Great Riddle, or the Action and Effects of Natural Forces and Conditions in the Creation. By F. Horridge. Pp. 98. 3*s.* 6*d.*

LE FRANÇOIS, Paris.
Notions Pratiques d'Électrothérapie Appliquée a l'Urologie. Par le Docteur Denis Courtade. Pp. 244. Fr.18.
Précis de Rachianesthésie Générale. By G. Le Filliatre. Pp. 123. Fr.8.

LIBRAIRE FÉLIX ALCAN, Paris.
Atlas de Syphilimétrie (100 Graphiques). By Arthur Vernes. Pp. 121. Fr.35.

LONGMANS, GREEN, AND CO., London.
The Chemistry of Synthetic Drugs. By Percy May, D.Sc. 3rd ed. Pp. 248. 12*s.* 6*d.*

MACMILLAN AND CO., London and New York.
The Community Health Problem. By A. C. Burnham, M.D. Pp. 160. 8*s.* 6*d.*

MELROSE, A., London.
Intestinal Toxæmia or Auto-Intoxication in the Causation of Disease. By A. Bryce, M.D. Pp. 180. 6*s.*

MORITZ PERLES, Vienna and Leipzig.
Das alte medizinische Wien in zeitgenössischen Schilderungen. Von Dr. M. Neuburger. Pp. 266. M.35.

Medical News.

ROYAL COLLEGE OF PHYSICIANS OF IRELAND.—Professor Harold Pringle and Dr. T. M. Thomson have been elected Fellows of the College.

ROYAL SANITARY INSTITUTE.—A lecture will be delivered on Wednesday, April 27th, at 5.30 P.M., by Colonel C. H. Melville, R.A.M.C., on Some Lessons of the War, at 90, Buckingham Palace-road, London, S.W.1.

CONJOINT BOARD OF SCIENTIFIC SOCIETIES.—At a general meeting of the board held in March last it was decided to discontinue the publication of the Annual Calendar and Fortnightly Bulletin of Scientific Meetings (Diary of Scientific and Technical Societies) owing to the heavy printing liabilities incurred.

ROYAL INSTITUTION OF GREAT BRITAIN.—On Tuesday, April 19th, at 3 P.M., Professor Arthur Keith, F.R.S., will give his first lecture on Darwin's Theory of Man's Origin (in the Light of Present Day Evidence). The Friday evening discourse on April 22nd will be delivered at 9 P.M. by Sir James Walker, F.R.S., on Electro-Synthesis in Organic Chemistry.

INSTRUCTION IN HOSPITAL ADMINISTRATION: *Diploma in Public Health.*—A three months' course of lectures and demonstrations in hospital administration is being held during April, May, and June at the Western Hospital, Seagrave-road, Fulham, London, S.W., by Dr. R. M. Bruce, on Tuesdays and Fridays, at 5 P.M. The fee for the course is £3 3*s.*, payable to the Clerk to the Metropolitan Asylums Board, Embankment, London, E.C.4.

INSTITUTE OF PHYSICS.—A meeting to inaugurate this institute will take place on Wednesday, April 27th, at 6 P.M., in the hall of the Institution of Civil Engineers, Great George-street, Westminster, London. Sir Richard Glazebrook will preside and Sir J. J. Thomson will deliver an address. Mr. A. J. Balfour is expected to be present and extend a welcome to the gathering. Non-members of the institute or of the societies associated with it may obtain tickets of admission on application to the secretary, 10, Essex-street, Strand, London, W.C. 2.

LONDON DERMATOLOGICAL SOCIETY.—A meeting of the society will be held at 4.30 P.M. on Tuesday, April 19th, at St. John's Hospital, 49, Leicester-square, London, W.C. Clinical cases will be shown by Dr. J. L. Bunch, Dr. W. Griffith, Dr. M. G. Hannay, and Dr. D. Vinrace. A discussion of the following resolution: "That the London Dermatological Society considers some form of compulsory notification for V.D. cases to be necessary," will be opened by Dr. W. K. Sibley for the affirmative, and Dr. D. Vinrace will lead the opposition.

ROYAL SOCIETY.—The papers to be read on April 21st are as follows:—Professor J. Joly, F.R.S.: A Quantum Theory of Colour Vision. Professor A. V. Hill, F.R.S.: The Energy Involved in the Electric Change in Muscle and Nerve. Mr. H. M. Kyle: The Asymmetry, Metamorphosis, and Origin of Flat Fishes, communicated by Mr. W. B. Hardy, secretary of the Royal Society. Mr. T. L. Prankerd: Studies in the Cytology of the Statolith Apparatus in Plants, viewed in Relation to their Habit and Biological Requirements, communicated by Professor W. M. Bayliss, F.R.S.

At the meeting on May 5th the Croonian lecture will be delivered by Dr. Henry Head, F.R.S., on Release of Function in the Nervous System.

POST-GRADUATE COURSE ON TUBERCULOSIS IN PARIS.—Under the auspices of the North of England Tuberculosis Society Dr. E. Rist has arranged a ten days' advanced course on tuberculosis in Paris for the latter part of May. The subjects will be treated in English, and will include artificial pneumothorax, experimental re-infection, the extent to which X ray work has affected our ideas regarding the pathology and diagnosis of lung tubercle, modern dispensary work, and so forth. One day will be spent at the Marine Hospital for Surgical Tuberculosis at Berck-sur Mer, and a visit has been arranged to Bligny Sanatorium. Special visits will also be paid to the Rockefeller Dispensaries, Pasteur Institute, Laennec Hospital, and other institutions. All tuberculosis officers, sanatorium physicians, and others specially interested in tuberculosis are invited to participate. The fee for the course has been provisionally fixed at Fr.200. Further particulars can be had from Dr. W. H. Dickinson, 91, New Bridge-street, Newcastle-upon-Tyne.

NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC.—A syllabus of the post-graduate courses to be held at this hospital during May and June has now been issued. Lectures and demonstrations will be given by Dr. Hinds Howell, Dr. A. Saunders, Dr. Grainger Stewart, Dr. James Taylor, Dr. Farquhar Buzzard, Dr. H. H. Tooth, Dr. Gordon Holmes, Dr. J. Collier, Dr. Risien Russell, Mr. S. R. Scott, Dr. Aldren Turner, Dr. Kinnier Wilson, Mr. P. Sargent, Dr. Russell Reynolds, and Mr. D. J. Armour. A series of six lectures and demonstrations on Neurological Ophthalmology will be given by Mr. Leslie Paton on Wednesdays, at 3.30 P.M., beginning on May 11th, if sufficient entries are received. Dr. Greenfield will give a course of lectures and demonstrations in pathology if sufficient entries are received: fee £3 3*s*. The fee for the post-graduate course is £7 7*s*., and should be paid to the secretary of the hospital. A special arrangement can be made for students who can attend one day a week only. The fee for the course in ophthalmology will be £4 4*s*. if taken alone, or £2 2*s*. if taken in conjunction with the post-graduate course. The Fellowship of Medicine's ticket will not admit to the above courses. Further information can be obtained from Dr. C. M. Hinds Howell, Dean of the Medical School, at the Hospital, Queen-square, London, W.C.1.

ASSOCIATION OF SCHOOL MEDICAL OFFICERS OF SCOTLAND.—A three days' conference was held last week in the Provincial Training College, Edinburgh. Dr. A. E. Kidd, president of the association, welcomed the delegates, and Dr. John Macpherson took the chair at the first session. In his opening address he dwelt on the importance of medical examination of school children, and alluded to the problem of the mental defective. In his opinion too much distinction had been drawn between mental and physical deficiency. Mental defect was a physical disease, just as were infantile paralysis or congenital heart disease, and ought not to be regarded as a thing apart. The great need at present was for institutions and special classes where defectives could be observed and sorted out. Dr. F. C. Shrubsall, speaking on mental deficiency, dwelt on the importance of excluding physical defects before judging a child, and also of estimating the extent to which the child had had continuous education, without frequent change of school and of methods. The aim of mental testing was to ascertain the extent to which the individual was able to appreciate the nature of any problem set before him, to direct his attention to this object, to profit by previous experience, and to criticise his results. At the second session of the conference Dr. Norman Walker delivered an address on Skin Diseases in Schools; and at the third session Dr. Angus MacGillivray read a paper on the Educationally Blind Child.

ROYAL INSTITUTE OF PUBLIC HEALTH.—A programme of the conferences to be held from June 2nd to 4th at the Guildhall, London, has been issued. The conferences will be opened on the 2nd, at 10 A.M., by the Duke of York. At the first session Municipal Hygiene and its Suggested Connexion with the Administration of the Poor-law, and the Future of Voluntary Hospitals will be discussed. Lord Burnham will preside, and among the medical speakers will be Sir Napier Burnett, Sir Alfred Fripp, and Sir Leslie Mackenzie. At 2 P.M. the Housing Problem in its Various Bearings will be dealt with under the presidency of Sir George McCrae. The medical speakers will include Lieutenant-Colonel F. E. Fremantle, M.P., and Dr. W. G. Savage. On June 3rd, at 10 A.M., Professor Edgar L. Collis will preside over a discussion on the Necessity for Greater Attention in Industry to the Maintenance of Efficiency and the Prevention of Ill Health; the speakers will include Professor Sir Thomas Oliver, Dr. H. M. Vernon, and Mrs. R. H. B. Adamson, M.D. At 2 P.M. the subject will be the Efficiency of the Present Machinery for Dealing with Venereal Diseases and the Additional Measures Essential for Effective Prevention, with the Bishop of Birmingham in the chair. The speakers will include Professor E. W. Hope, Sir William Milligan, Professor Winifred Cullis, D.Sc., Colonel C. J. Bond, Dr. F. N. Kay Menzies, Mrs. Mary Scharlieb, M.D., Dr. J. H. Sequeira, Mrs. Marie Stopes, D.Sc., and Dr. Mary Sturge. The fifth and last session will be held on June 4th at 10 A.M., when the Efficiency of the Present Machinery for Dealing with Tuberculosis will be the subject discussed. Professor Sir Robert W. Philip will preside, and the medical speakers will include Professor S. Lyle Cummins, Professor Sir German S. Woodhead, Dr. Noel D. Bardswell, Sir Henry Gauvain, Dr. T. Hartley Martin, Dr. J. J. Perkins, Lieutenant-Colonel Nathan Raw, Dr. P. C. Varrier-Jones, and Dr. Jane Walker. Fellows, Members, and Associates of the Royal Institute of Public Health can obtain membership tickets on application to the secretary at the offices of the Institute. For delegates and others desirous of taking part, tickets will be issued at one guinea each. All communications to be addressed to the Hon. Secretaries, 37, Russell-square, London, W.C.1.

GREAT NORTHERN CENTRAL HOSPITAL.—At the monthly meeting on April 7th the committee of management passed a resolution recording its opinion that: (*a*) Insured persons treated both as in- and out-patients should be paid for in full by Approved Societies; (*b*) payment should be made to the hospitals by the societies concerned by means of capitation grants, and not by the handing over of lump sums; (*c*) in view of the general public's limited opportunities of gaining knowledge of voluntary hospital questions an effort should be made to form a Voluntary Hospitals' Publicity and Propaganda Committee, towards the funds of which all hospitals should be invited to subscribe according to their number of beds and out-patients; (*d*) such a committee should consist of hospital representatives with some of the best publicity experts. It should endeavour to promote the interests of voluntary hospitals generally, and leave it to individual institutions to make known their particular needs.

MANCHESTER CHILDREN'S HOSPITAL.—Owing to financial stress last year this hospital was forced to close one of its wards, thus reducing the number of beds from 180 to 150. Fortunately a grant of £20,000 from the National Relief Fund has for the time being obviated further curtailment of the hospital's services. The daily cost of each child patient is now over 7*s*., against 3*s*. in 1913.

LEICESTER MEDICAL SOCIETY: POST-GRADUATE LECTURES.—A course of post-graduate lectures will be given at the Leicester Royal Infirmary on Wednesdays, at 4.45 P.M., from April 20th to May 18th. Dr. Arthur Hurst will lecture on Gastric and Intestinal Diseases on April 20th and May 4th, Dr. G. F. Still on Urinary Disorders of Childhood and Dietetic Causes of Disorders in Infancy and Childhood on May 11th and 18th, and Mr. R. C. Elmslie on Manipulative Surgery on April 27th.

WEST KENT MEDICO-CHIRURGICAL SOCIETY.—A meeting of this society was held in the Miller Hospital, Greenwich, on March 11th, Dr. A. M. Cato presiding. Dr. Beatrice Lovibond showed a case of Spina Bifida in a girl of 17. Dr. Hildred Carlill gave a lecture on the Manifestations of Hysteria, illustrated by lantern slides. Many of these showed the cure of long-standing palsy of one or other limb, or the relief of spasms, tremors, and contractures. He contended that more disabilities of all sorts are due to mental than to physical causes, also that every one of these former could probably be prevented if its onset were witnessed by someone with the requisite knowledge and personality. Dr. Carlill set out a broad grouping of the varying types of hysterical disorder, and read the notes of a case which was treated by psycho-therapy, and which ended in tragedy. He then discussed treatment under the headings (1) preventive, (2) curative, by (*a*) conversation and exploration, (*b*) suggestion, and (*c*) psycho-analysis.

ROYAL ABERDEEN HOSPITAL FOR SICK CHILDREN.—The annual meeting of this hospital was held on March 28th, Sir Thomas Burnett presiding. The annual report showed that the number of cases treated during 1920 amounted to 1063 in-patients and 3008 out-patients, almost double the numbers of 1919. The ordinary expenditure exceeded the income by £2134 9*s*. 2*d*. Towards the reduction of this sum the whole amount of the legacies received, £1171 6*s*. 8*d*., has been applied, leaving a net deficiency of £963 2*s*. 6*d*., which has been cleared off by reducing the capital funds by that amount. The average daily expenditure per patient now amounts to about 5*s*., more than twice as much as in 1914. During the year subscriptions to the amount of £1522 15*s*. 7*d*. have been paid to the honorary treasurer for the building fund. The total amount subscribed for the building fund on Dec. 31st, 1920, was £43,162 15*s*. 5*d*. A new department has been instituted for treatment of diseases of the skin.

EXHIBITIONS OF COLOUR PHOTOGRAPHY.—The exhibition of the Prizma Master Pictures, held at the Alhambra Theatre, London, on April 8th, illustrated what has been achieved in natural colour photography. A series of films showed the possibilities of this new process in reproducing bowls of fruit, butterflies, gorgeous gowns, scenes on sea and mountain, and most impressively a peep into the crater of Kilaueas. The value of colour films for nature study was also well brought out in a picture representing a day with John Burroughs, a well-known naturalist. Prismatic effect was not altogether eliminated, but on the whole the exhibit evinced a high standard in colour kinematography. A second effort in colour kinematography, based on a somewhat different process, was the subject of a preliminary exhibition at the House of the Royal Society of Medicine on April 11th, when the basis of this process was illustrated by a series of medical lantern slides. The colours in this case were remarkably vivid and free from any screen effect. This exhibit was by the European Art Publishing Society, of 21, Russell-street, London, W.C.

CHELSEA HOSPITAL FOR WOMEN.—The annual general meeting of governors will be held at the hospital, Arthur-street, London, S.W., on Thursday, April 21st, at 4 P.M., the President of the hospital, the Marquess of Londonderry, presiding. A public meeting will be held at 5.30 P.M. on the same day, at the Town Hall, Chelsea, in order to urge the claims of the hospital for public support.

NORTH-EAST LONDON POST-GRADUATE COLLEGE.—A special post-graduate course will be held at the Prince of Wales's General Hospital, Tottenham, London, N., from April 25th to May 7th. This course will include the practical demonstration of modern clinical and laboratory methods of the diagnosis and treatment of disease; the exhibition of groups of cases illustrating some particular subject; a series of clinical lectures closely associated with medical practice; and demonstrations of cases at special hospitals. The fee for the course, to those not members of the Fellowship of Medicine, is 3 guineas, or 2 guineas for either week. A detailed syllabus can be obtained on application to the Dean. The lectures, at 4.30 P.M. daily, are free to qualified medical practitioners. Names of those wishing to attend should be sent, not later than April 21st, to the Dean at the hospital or to the Secretary of the Fellowship of Medicine at 1, Wimpole-street, London, W.1.

RONTGEN SOCIETY.—A general meeting will be held on Thursday, April 21st, at 8.15 P.M., in the Physics Lecture Theatre, University College, Gower-street, London, W.C. A paper on a New Form of Stereo-fluoroscope will be read by Professor A. M. Tyndall, D.Sc., and Mr. E. G. Hill, B.Sc. A special meeting of the society will be held at Manchester on Friday, May 6th, at 8 P.M., at the University. Professor W. L. Bragg will deliver a paper and Professor A. V. Hill, F.R.S., will give a demonstration of some electro-physiological experiments. The society's exhibition will be held at the Royal Photographic Society during the whole of June. The President, Dr. Robert Knox, offers silver and bronze plaques for the best and second best collection of four prints, the work of an assistant employed at a hospital or working for a qualified radiologist, which prints must be delivered, not later than May 24th, to the Secretary, Rontgen Society Exhibition, 35, Russell-square, London, W.C.1. The Silvanus Thompson Memorial Lecture will be delivered by Professor A. V. Hill at the next general meeting of the society on May 19th, on Electrical Instruments and Phenomena in Physiology.

BRITISH HOME FOR AUSTRIAN CHILDREN.—The historic estate of Klessheim in Salzburg has been adapted as a permanent home for children, of which the legal ownership and ultimate financial responsibility rest with "The British Home for Austrian Children, Limited"—a company not for profit—which has been formed for the purpose by the Berkshire Committee of the Save the Children Fund. Thirty children are now in residence, but once clothing and funds are forthcoming there is accommodation for 500. It is not intended to make of Klessheim a convalescent home for seriously sick or diseased children, but primarily to admit children who are under-nourished and run-down. The management committee includes a medical man, Dr. G. S. Abram, and the Vienna Executive Committee includes Miss Harriette Chick, D.Sc., Dr. Ronald Macfie, and Dr. Ferrière, with Dr. Max Winter, Dr. Josef Griez, Herr Wilhelm Ofenheim, and Professor Dr. Clemens Pirquet among the Austrian Consulting Members. Donations, particularly annual subscriptions, are invited, and should be sent either to the hon. treasurer, J. H. Simonds, Esq., Barclay's Bank, Reading, or to the office at Threadneedle House, 34, Bishopsgate, London, E.C.2.

UNIVERSITY OF BRISTOL.—On April 7th, at the invitation of the Vice-Chancellor and the Council of the University of Bristol, representatives of the press were entertained to lunch at the Royal Hotel. The Vice-Chancellor gave an interesting survey of the steps which had led up to the appeal for funds which the University is about to make. He recalled the leading part played by Bristol in the times of the Tudor sovereigns, and gave reasons for thinking that she might yet regain the place as the second port and second city of the kingdom. Coming to present times, he reviewed the advantages enjoyed by Bristol in the matter of University provision; he enumerated the colleges from which the University had been founded, and spoke of the central and spacious site on which most of the buildings—some complete and others being built—stand, alluding to the splendid generosity of the Wills family. Much more money was needed for endowments to meet the cost of maintenance, and the Vice-Chancellor expressed the hope that this would be collected from local and private benefactors rather than received, at some cost of freedom, from the Government. After lunch a visit of inspection was paid to the University buildings, and each guest received a portfolio of finely executed drawings of the buildings actual and prospective.

DONATIONS AND BEQUESTS.—By the death of Mr. Alexander Kilgour, of South Loirston and Cove, which took place recently, important bequests fall to the University of Aberdeen and Morningfield Hospital for Incurables. The proceeds of the estate will be divided as follows: one-fifth to the Mechanics Institution, one-fifth to Morningfield Hospital, and three-fifths to the University of Aberdeen. The estate has a rental of some £2000.—The Chelsea Hospital for Women has received from the trustees of the Zunz Bequest a grant of £400 in maintenance of its Annie Zunz Wards.

THE REFORMED PUBLIC HOUSE.—The People's Refreshment House Association, Ltd., which aims at the encouragement of temperance in the use of alcoholic drinks at licensed establishments and the provision of facilities for the supply of food and non-alcoholic refreshment at such places, can prove a satisfactory year's working for 1920. The annual report to be submitted to the annual general meeting to be held at 193, Regent-street, London, W., on April 25th shows that up to Dec. 31st last the association held 165 licensed inns, of which 26 were taken over during the year. After writing off a sum for repairs, placing £5142 to depreciation reserve, and paying £2500 interest on loan stock, the amount available for disposal is £14,417 6s. 11*d*. The profits for 1920 were at the rate of 12½ per cent. on the share capital issued. Grants totalling £747 have been made during the year out of the public utility fund to various local institutions. It is pointed out that if the good work of the association is to expand new capital will be needed.

TELEPHONE SERVICE IN DUBLIN.—At their last meeting the President and Fellows of the Royal College of Physicians of Ireland passed a resolution protesting against the proposed increase in the charges for the telephone service in view of the progressive deterioration of the service since it came into the hands of the Post Office. At the present time no subscriber can be confident of getting a call through. At night, owing to the curfew regulations, which prohibit the public from being abroad at night, no one can employ messengers, and important messages are sometimes delayed all night. In one of the hospitals a few months ago an urgent operation case arrived during curfew hours. No message could be got through on the telephone to the surgeon on duty, and were it not that a voluntary messenger, at the possible risk of his life or liberty, undertook to convey the message on foot a life would probably have been lost. The College adds to its protest a statement that, owing to the inefficiency of the service, medical practice in and near Dublin is hampered and life and health are endangered.

MILK ORDERS.—Orders have been issued, the effect of which is to continue in force the provisions already contained in the Orders of the Food Controller with regard to milk of special hygienic quality, the addition of colouring matter and water to milk, and the reconstitution of milk. With regard to the first matter, the effect of the new Order is that licences for the sale of Grade A and Grade A (Certified) milk will be issued by the Minister of Health instead of being issued as heretofore by the Food Controller on the advice of the Minister. It will be competent to the local authority to take such steps as may be arranged in connexion with the issue of licences, and to institute proceedings in any case in which milk is sold within their area under either of the specified designations, but without a licence in that behalf. The provisions of the Order as to the addition of colouring matter or water and as to the reconstitution of milk form a supplement to the powers of the authority under the Sale of Food and Drugs Acts. The licensing of wholesale dealers in milk and the registration of retail dealers will be continued for the present by the Board of Trade as the successor of the Food Controller, the latter function being exercised through the District Commissioners. Copies of the Orders may be obtained from H.M. Stationery Office.

KING EDWARD'S HOSPITAL FUND FOR LONDON.—The annual meeting of the President and General Council of King Edward's Hospital Fund for London, to receive the accounts and report for the year 1920, was held at St. James's Palace on April 12th, H.R.H. the Prince of Wales being in the chair. Lord Revelstoke, the honorary treasurer of the Fund, presented the balance-sheet which included the items relating to the emergency distribution on July 5th last, and the distribution of surplus Red Cross Funds carried out on July 23rd through the instrumentality of the Fund. A full statement as to the general receipts having been made at the meeting of the Council on Dec. 14th last (see THE LANCET Dec. 25th, 1920, p. 1230), when the scale of ordinary awards was adopted, the treasurer said he had nothing to add in these respects, and made the gratifying announcement that for the year ending Dec. 31st the Fund had been enabled to provide out of income nearly £195,000 towards the ordinary distribution of £200,000. The balance was drawn

from reserve, whence also came the £250,000 to meet the emergency distribution, the effect of which had been to reduce the available funds of the corporation by about one-fourth, implying a loss of income amounting to £16,000 per annum. Lord Revelstoke added that the Finance Committee were compelled to point out that such emergency distributions could not be repeated without serious detriment to the position and utility of the Fund. The account of the receipts and expenditure and the balance-sheet having been unanimously adopted, the Chairman of the Executive Committee, Lord Stuart of Wortley, moved the adoption of the report of the Council for the year 1920. The resolution was seconded by Lady Hall and carried unanimously. The Prince of Wales, who was warmly received on addressing the Council, read a message of congratulation from the King, and then referred with pleasure to the fact that Lord Cave's Committee had reported decidedly in favour of the voluntary system of hospital management. "It was," said His Royal Highness, "for the maintenance of that system that King Edward founded the Fund, and that it still exists. I think that everybody here is convinced that it is the best system both for the patients and for the public. I am very glad that the evidence has already brought Lord Cave's Committee unanimously to the same opinion." The proceedings terminated with a vote of thanks to His Royal Highness for presiding.

Appointments.

GRIFFITHS, A., M.B., F.R.C.S. Edin., has been appointed a Medical Referee under the Workmen's Compensation Act for the Sheriffdom of Stirling, Dumbarton, and Clackmannan.

HAIRE, N., M.B., Ch.M. Sydney, one of the Hon. Physicians of the Saffron Hill Maternity Centre (Holborn, Finsbury, and City Border).

HIRSCH, Capt. C. T. W., late R.A.M.C., Anæsthetist, London Temperance Hospital.

SAVAGE, A. H., M.B., B.Ch. Oxon., D.P.H., Health Officer, Kuala Lumpur, Selangor, Malay Federated States.

THOMAS, C. N., M.B., B.Ch. Cantab., Medical Officer to the Infectious Diseases Hospital at Alvington, Gloucestershire.

Seamen's Hospital Society: Hospital for Tropical Diseases, and the London School of Tropical Medicine: ROGERS, Sir LEONARD, I.M.S., Extra Physician for Clinical Research and Lecturer; CLEMESHA, Col. W. W., I.M.S., Lecturer on Hygiene of the Tropics.

Certifying Surgeons under the Factory and Workshop Acts: VISGER, C., L.R.C.P. Lond., M.R.C.S. (Clevedon); JOHNSTON, C. H. F. (Frome).

Vacancies.

For further information refer to the advertisement columns.

Bethlem.—Two Res. H.P.'s. £25 per quarter.

Bethnal Green Hospital, Cambridge-road, E.—Fourth Asst. M.O. £400.

Birmingham and Midland Homœopathic Hospital.—Res. H.S. £175.

Birmingham, Queen's Hospital.—Pathologist. £100.

Bramshott, Hants, King George's Sanatorium for Sailors.—Med. Supt. £600.

Bristol General Hospital.—H.S. £175.

Buxton, Derbyshire, Devonshire Hospital.—Asst. H.P. £130.

Capetown City.—Asst. M.O.H. £850.

Charing Cross Hospital, Agar-street, W.C.—P. in Charge Department of Radiology and Electro-therapeutics.

Chester Royal Infirmary.—Hon. S. Hon. Asst. P. Also Asst. H.S. £175.

City of London Hospital for Diseases of the Chest, Victoria Park, E.—H.P. £100.

Cornwall Mental Hospital, Bodmin.—Locum Tenens. 7 guineas per week.

Dewsbury County Borough.—Asst. Sch. M.O. and Asst. M.O.H. £500.

Dr. Barnardo's Homes, Australasian Hospital, Girls' Village Home, Barkingside.—Female Res. M.O. £150.

Eastbourne, Princess Alice Hospital.—H.S. £175.

East London Hospital for Children and Dispensary for Women, Shadwell, E.—Res. M.O. £200. H.S. and H.P. £125. Cas. O. £120.

Elizabeth Garrett Anderson Hospital, Euston-road.—Female Clinical Assistants in Venereal Diseases Department. £1 1s. per attendance.

Enham Village Centre for Disabled Ex-Service Men, near Andover, Hants.—Asst. M.O. £350.

Evelina Hospital for Children, Southwark, S.E.—Hon. Dent. S. Also H.P. and H.S. £160.

Gloucester County Asylum.—Asst. M.O. £300.

Great Northern Central Hospital, Holloway, N.—Anæsth. £10 10s.

Guildford, Royal Surrey County Hospital.—H.S. £150.

Hospital for Sick Children, Great Ormond-street, W.C.—H.S. £50.

Hove, Carr-Burton Memorial Hospital, Sackville-road.—Res. M.O. £250.

Huddersfield Royal Infirmary.—Two Jun. H.S.'s. £150.

Johannesburg, University College.—Sen. Lecturer in Physiology. £516.

Kent Education Committee.—Female Sch. Med. Inspector. £600.

Leeds Infirmary, Beckett-street.—First Asst. M.O. £600.

Lewisham Municipal Ante-Natal and Child Welfare Clinic, Catford, S.E.—Holiday Engagement. 7 guineas per week.

London Homœopathic Hospital, Great Ormond-street and Queen-square, Bloomsbury, W.C.—Asst. S.

London Temperance Hospital, Hampstead-road, N.W.—Hon. Asst. P.

Manchester, Booth Hall Infirmary for Children, Charlestown-road Blackley.—Asst. Res. M.O. £350.

Manchester County Asylum, Prestwich.—Asst. M.O. £572 18s.

Manchester, Crossley Sanatorium, Delamere Forest, Cheshire.—Asst. M.O. £350.

Metropolitan Hospital, Kingsland-road, E.—Cas. O. and Res. Anæsth. £120

Middlesbrough, North Riding Infirmary.—Jun. H.S. and Sen. H.S. £150 and £200 respectively.

Miller General Hospital for South-East London, Greenwich, S.E.—H.P. £150.

Newark Hospital and Dispensary.—Res. H.S.

Newcastle-upon-Tyne, Royal Victoria Infirmary.—Res. M.O. £350.

Newport, Mon., Royal Gwent Hospital.—H.S. £200.

Oldham County Borough.—Asst. M.O. and Asst. Tuberc. O. £600.

Oldham Royal Infirmary.—Three H.S.'s. £250, £250, and £200 respectively.

Pembroke County.—County M.O.H. and Sch. M.O. £700.

Preston, Lancs, County Asylum, Whittingham.—Asst. M.O. £572 18s.

Queen Mary's Hospital for the East End, Stratford, E.—H.P. and H.S.

Queen's Hospital for Children, Hackney-road, Bethnal Green, E. Two Cas. H.S.'s. £100.

Rotherham Hospital.—Sen. H.S. £250. Also Jun. H.S. £150.

Royal Chest Hospital, City-road, E.C.—H.P. £120.

St. John's Hospital for Diseases of the Skin, 49, Leicester-square, W.C.—Pathologist. £100.

St. Mary's Hospital for Women and Children, Plaistow, E.—Hon. Anæsth.

St. Peter's Hospital for Stone, &c., Henrietta-street, Covent Garden, W.C.—Jun. H.S. £75.

Salford Royal Hospital.—H.S.'s £150. Cas. H.S. £150.

Sheffield, Jessop Hospital for Women.—Asst. H.S. £100.

Sheffield Royal Infirmary.—H.S.'s, H.P.'s, Aural H.S., and Asst. Cas. H.S. £150 each.

Southampton Free Eye Hospital.—Asst. Hon. Ophth. Surg.

Staffordshire General Infirmary, Stafford.—H.S. £250.

Wakefield, West Riding Asylum.—Jun. Asst. M.O. £400.

Warwick Union.—M.O. £100.

West London Hospital, Hammersmith-road, W.—Cas. O. £5 5s per week.

Wigan Infirmary.—Hon. S.

York County Hospital.—H.S. £200.

The Chief Inspector of Factories, Home Office, S.W., gives notice of a vacancy under the Factory and Workshop Acts at Burton-upon-Trent.

Births, Marriages, and Deaths.

BIRTHS.

READE.—On April 9th, at New End Hospital, Hampstead, the wife of Dr. Arthur G. L. Reade, O.B.E., of a son.

RUSSELL.—On April 10th, at the Little House, Gerrard's Cross, the wife of Trevor C. Russell, M.B., of a daughter.

SHOWELL-ROGERS.—On April 9th, at Nottingham-place, W., the wife of E. N. Showell-Rogers, M.B. Cantab., of a son.

WOODWARK.—On April 11th, at 4, Harley-street, W., to Hilda (née Robinson), wife of A. S. Woodwark, C.M.G., C.B.E., M.D., F.R.C.P.—a son.

MARRIAGES.

GRIFFITH—VISICK.—On the 11th April, at Lyndhurst-road Church, Hampstead, by the Rev. Dr. R. H. Horton, John Richard Griffith, F.R.C.S. Eng., son of Arthur F. Griffith and Mrs. Griffith, of 59, Montpellier-road, Brighton, to Elsie Maud Visick, M.R.C.S., L.R.C.P., daughter of Dr. and Mrs. Hedley C. Visick, of 35, Rosslyn-hill, Hampstead.

DEATHS.

DUNCAN.—On April 6th, at Park House, Croydon, Peter Thomas Duncan, M.D., in his 73rd year.

MINNS.—On April 6th, the result of a motor accident, Captain Allan Noel Minns, D.S.C., M.C., R.A.M.C., Alexandra House, Thetford, Norfolk.

TAYLOR.—On April 7th, at Lovelace Lodge, Surbiton, Arthur Sneyd Taylor, M.D. Cantab., F.R.C.S., after a short illness.

WRIGHT.—On April 2nd, accidentally drowned on Summer Lodge Moor, Swaledale, Yorkshire, Joseph Farrall Wright, M.R.C.S., L.R.C.P., of Chorley New-road, Bolton, in his 56th year.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

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SOCIETIES.

ROYAL SOCIETY, Burlington House, London, W.

THURSDAY, April 21st.—Papers: Prof. J. Joly: A Quantum Theory of Colour Vision.—Prof. A. V. Hill: The Energy Involved in the Electric Change in Muscle and Nerve.—Mr. H. M. Kyle: The Asymmetry, Metamorphosis, and Origin of Flat Fishes (communicated by Mr. W. B. Hardy, secretary of the Royal Society).—Mr. T. L. Prankerd: Studies in the Cytology of the Statolith Apparatus in Plants, viewed in Relation to their Habit and Biological Requirements (communicated by Prof. W. M. Bayliss).

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MEETINGS OF SECTIONS.

Tuesday, April 19th.

SECTION OF THERAPEUTICS AND PHARMACOLOGY: at 4.30 P.M.

Annual General Meeting—Election of Officers and Council for 1921–1922.

Papers: Sir Leonard Rogers: Treatment of Leprosy and Tuberculosis with Sodium Gynocardate.

Dr. R. R. Walker: The Action and Uses of Kaolin in the Treatment of Asiatic Cholera.

SECTION OF TROPICAL DISEASES AND PARASITOLOGY.—Members of this Section are cordially invited to attend the above meeting.

SECTION OF PATHOLOGY: at 8.30 P.M.

Annual General Meeting—Election of Officers and Council for 1921–1922.

Communications: Sir Lenthal Cheatle: Parenchymatous Inflammation of the Breast.

Mr. A. T. Glenny, Miss K. Allen, and Dr. R. A. O'Brien: (1) Schick Reaction; (2) Diphtheria Prophylactic Immunisation with Toxin Anti-toxin Mixture.

Dr. E. H. Kettle and Dr. Joan Ross: A Contribution to the Study of the Endotheliomata.

Wednesday, April 20th.

SECTION OF HISTORY OF MEDICINE: at 5 P.M.

Papers: Dr. T. Wilson Parry: The Prehistoric Trephined Skulls of Great Britain, with Description of Operations Performed.

Dr. F. G. Chandler: The History of the Diagnosis and Treatment of Empyema.

Thursday, April 21st.

SECTION OF DERMATOLOGY: at 5 P.M. (Cases at 4.30 P.M.)

Cases: Dr. Parkes Weber: A Condition Somewhat Resembling Lupus Pernio in a Child.

Dr. MacCormac: (1) Extensive Rodent Ulcer Treated by Massive Dosage of Radium; (2) Granuloma Annulare.

Other cases will be shown.

Friday, April 22nd.

SECTION OF STUDY OF DISEASE IN CHILDREN: at 5 P.M. (Cases at 4.30 P.M.)

Cases: Mr. C. Max Page: A Case of Renal Dwarfism.

Other cases will be shown.

SECTION OF EPIDEMIOLOGY AND STATE MEDICINE: at 8.30 P.M.

Paper:

Dr. W. M. Willoughby: Collated Experiences of Plague on Ships.

ROYAL SOCIETY OF ARTS, John-street, Adelphi, W.C.

MONDAY, April 18th.—8 P.M., Cantor Lecture (II.):—Dr. S. J. Lewis: Recent Applications of the Spectroscope and the Spectrophotometer to Science and Industry.

WEDNESDAY.—8 P.M., Sir James Cantlie: (1) Thomson's Apparatus for Armless Men; (2) X Ray Motor Ambulance Service for the United Kingdom. (The Thomson Machine will be exhibited and its uses demonstrated by an armless man.)

FRIDAY.—4.30 P.M., Sir George Birdwood Memorial Lecture:—Lt.-Col. Sir Edward W. M. Grigg: The Common Service of the British and Indian Peoples to the World.

LONDON DERMATOLOGICAL SOCIETY, St. John's Hospital, 49, Leicester-square, W.C.

TUESDAY, April 19th.—4.30 P.M., Pathological Specimens. Cases sent for Consultation. Clinical Cases will be shown by Dr. J. L. Bunch, Dr. W. Griffith, Dr. M. G. Hannay, and Dr. D Vinrace. Discussion on the following resolution: "That the London Dermatological Society considers some form of compulsory notification for V.D. cases to be necessary," to be opened by Dr. W. K. Sibley for the affirmative and Dr. D. Vinrace for the negative.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.

Museum Demonstrations in the Theatre of the College for Advanced Students and Medical Practitioners:—

MONDAY, April 18th.—5 P.M.: Prof. Shattock: Myxoma; Chondroma.

FRIDAY.—5 P.M., Prof. Keith: Microscopic Structure of the Colon in Health and Disease.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith, W.

MONDAY, April 18th.—2 P.M., Dr. S. Pinchin: Medical Out-patients. Dr. Simson: Diseases of Women. 2.30 P.M., Dr. A. Saunders: Visit to Medical Wards. Mr. Baldwin: Visit to Surgical Wards.

TUESDAY.—10 A.M., Mr. Steadman: Dental Department. 2 P.M., Dr. Burnford: Medical Out-patients. Mr. Banks Davis: Diseases of the Throat, Nose, and Ear. 2.30 P.M., Mr. Addison: Visit to Surgical Wards.

WEDNESDAY.—10 A.M., Mr. MacDonald: Genito-Urinary Department. 2 P.M., Mr. D. Armour: Visit to Surgical Wards. Mr. Sinclair: Surgical Out-patients. Mr. Gibb: Eye Department.

THURSDAY.—2 P.M., Mr. B. Harman: Eye Department. Mr. MacDonald: Surgical Out-patients. Mr. Baldwin: Orthopædic Department. Mr. D. Armour: Operations.

FRIDAY.—10 A.M., Dr. Robinson: Gynæcological Operations and Visit to Wards. Dr. McDougal: Electrical Department. 2 P.M., Mr. T. Gray: Surgical Out-patients. Dr. Morton: X Ray Department. Dr. Pernet: Skin Department. 2.30 P.M., Dr. Pritchard: Visit to Medical Wards.

SATURDAY.—10 A.M., Dr. A. Saunders: Medical Diseases of Children. 2 P.M., Dr. Owen: Medical Out-patients.

Daily:—10 A.M. Ward Visits. 2 P.M., In-patient, Out-patient Clinics and Operations.

ST. MARYLEBONE GENERAL DISPENSARY, 77, Welbeck-street, Cavendish-square, W.

Post-Graduate Course on Infant and Child Welfare.

A Course of Twelve Practical Demonstrations on the Management and Feeding of Infants and Young Children by Dr. E. Pritchard to Qualified Practitioners.

TUESDAY, April 19th.—10.30 A.M., Demonstration V., The Modification of Milk.

THURSDAY.—3 P.M., Demonstration VI., The Uses of Dried Milk and Patent Foods.

ROYAL INSTITUTION OF GREAT BRITAIN, Albemarle-street, Piccadilly, W.

TUESDAY, April 19th.—3 P.M., Lecture (I.):—Prof. A. Keith: Darwin's Theory of Man's Origin (in the Light of Present Day Evidence).

FRIDAY.—9 P.M., Discourse:—Sir James Walker: Electro-Synthesis in Organic Chemistry.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE CLINIC.

TUESDAY, April 19th.—4.30 P.M., Lecture:—Mr. J. P. Buckley: Intussusception.

Communications, Letters, &c., to the Editor have been received from—

A.—Dr. H. el Arculli, Liverpool; Dr. R. E. Apperly, Lond.

B.—British Homes for Austrian Children, Lond., Sec. of; Mr. C. W. G. Bryan, Lond.; Dr. M. I. Balfour, Simla; British Museum (Natural History), Lond., Director of; Dr. D. de Broglio, Tunis; Messrs. Burgoyne, Burbidges, and Co., East Ham; Mr. H. J. Bucklin, Lond.; Board of Control, Lond.; Mr. J. Burns, Edinburgh; Barnstaple, Medical Officer of Health of; Dr. G. Blacker, Lond.

C.—Mr. R. T. Cook, Workington; Mr. G. H. Clark, Glasgow; Dr. H. P. Cholmeley, Forest Row; Miss G. Cowlin, Lond.; Chelsea Hospital for Women, Lond.; Chicago School of Sanitary Instruction; Dr. C. Coombs, Bristol; Prof. E. L. Collis, Cardiff; Conjoint Board of Scientific Societies, Lond.; Dr. A. Cooke, Cambridge.

D.—Dr. H. Dutch, Lond.

E.—Dr. J. Elliott, Chester; Dr. G. Evans, Lond.

F.—Dr. A. G. T. Fisher, Radlett; Dr. J. G. Forbes, Lond.; Factories, Chief Inspector of, Lond.; Dr. H. French, Lond.

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H.—Hunterian Society, Lond.; Mr. H. R. Heber, Lond.; Dr. R. C. Holt, Didsbury; Heritage Craft Schools, Chailey, Hon. Sec. of; Dr. C. L. Hewer, Lond.; Mrs. F. A. Hornibrook, Lond.; Dr. C. O. Hawthorne, Lond.

I.—Institute of Physics, Lond.

J.—*Journal of Industrial Welfare*, Lond., Editor of.

K.—Mr. G. Kendall, Lond.; Lord Knutsford, Royston; Dr. W. W. Keen, Philadelphia; King Edward's Hospital Fund for London.

L.—Mr. E. P. Leavy, Lond.; Mr. N. C. Lake, Lond.; Dr. R. B. Low, Lond.; *London Panel Gazette*, Lond.; Dr. Lillienstein, Bad Nauheim; London Society, Lond.; Dr. C. Lillingston, Gorleston-on-Sea; Liverpool Hospital for Children; London and Counties Medical Protection Society, Lond.; Dr. H. C. Lucey, Lond.; Leicester Medical Society, Hon. Sec. of; Dr. A. W. Lemarchand, Barnstaple; London Dermatological Society; Dr. S. A. Lane, Bognor.

M.—Dr. P. Manson-Bahr, Lond.; Metropolitan Asylums Board, Lond.; Dr. D. McKenzie, Lond.; Margate Chamber of Commerce, Sec. of; Dr. W. C. Morton, Leeds; Mr. R. W. Maxwell Muller, St. Mawes; Prof. J. J. R. Macleod, Toronto; Merchants' Association of New York; Dr. S. G. Moore, Huddersfield.

N.—North of England Tuberculosis Society, Newcastle-on-Tyne, Hon. Sec. of; National Housing and Town Planning Council, Lond.; National Hospital for the Paralysed and Epileptic, Lond., Dean of; National League for Health, Maternity, and Child Welfare, Lond.; Dr. H. Nockolds, Lond.

P.—People's Refreshment House Association, Lond.; Dr. F. J. Poynton, Lond; Mr. M. J. Parker, Rotherham; Mr. H. Platt, Manchester; Mr. W. B. I. Pollock, Glasgow; Dr. M. Ponzio, Turin; Dr. J. Phillips, Bradford; Mr. P. S. Price, Lond.; Parliamentary Medical Committee, Lond., Sec. of.

R.—Dr. J. D. Rolleston, Lond.; Royal Society, Lond.; Royal Society of Medicine, Lond.; Royal Society of Arts, Lond.; Royal College of Surgeons of England, Lond.; Royal Institute of Public Health, Lond.; Mr. H. J. Ripka, Lond.; Royal Institution of Great Britain, Lond.; Royal Sanitary Institute, Lond.; Royal Academy of Arts, Lond.; Rontgen Society, Lond.

S.—Dr. G. A. Stephens, Swansea; Dr. H. E. Smith, Lond.; Mr. W. B. Secretan, Reading; Dr. E. I. Spriggs, Banff; Dr. S. N. Scott, Plymstock; Savoy Hotel Laundry, Lond.; Mr. A. F. Shepherd, Lond.; Prof. W. Stirling, Manchester.

T.—Dr. W. W. C. Topley, Lond.; Dr. G. N. W. Thomas, St. Albans.

U.—University of Edinburgh, Sec. of.

V.—Dr. C. W. Vining, Leeds; Dr. J. C. Voigt, Southport.

W.—Dr. E. L. White, Southampton; Mr. A. J. Walton, Lond.; Dr. H. Wingfield, Lond.; West Kent Medico-Chirurgical Society, Lond., Hon. Sec. of; West London Post-Graduate College; Dr. J. D. Wynne, Norwich; Dr. J. Warnock, Cairo; Dr. J. Walker, Whitchurch; Sir G. S. Woodhead Cambridge.

Notes, Short Comments, and Answers to Correspondents.

DISEASES DESCRIBED BY MEDICAL MEN WHO SUFFERED FROM THEM.[1]

BY SIR HUMPHRY ROLLESTON, K.C.B., M.D CAMB., F.R.C.P. LOND.

EMERITUS PHYSICIAN, ST. GEORGE'S HOSPITAL SENIOR PHYSICIAN, VICTORIA HOSPITAL FOR CHILDREN.

IN the selection of a subject in response to your complimentary invitation it was obviously unwise to encroach on those aspects of medicine that your teachers deal with so much more advantageously, and I have accordingly chosen one on which it is to be hoped that none of them—though here I am not on safe ground—are personally competent to speak with real authority—namely, diseases described by medical men suffering from them. Stephen Paget, in his delightful *Confessio Medici*, says: "You cannot be a perfect doctor till you have been a patient: you cannot be a perfect surgeon till you have enjoyed" (and he goes on to emphasise his choice of this verb) "in your own person some surgical experience." According to this line of reasoning the perfect author should be a man of many joys (or sorrows?); and though I wish them well it is not this kind of joy that your teachers deserve.

Victims to Their Specialty.

Although the title, "Diseases Described by Medical Men who have Suffered from Them," excludes the examples of medical men who have paid particular attention to a disease and eventually fallen a victim to their specialty, a brief reference to this subject may perhaps be made. It has been said, possibly inspired by the attractive speculation that auto-suggestion is at work, that this sequence is common, and Sir William Hale-White tells me that Sir Samuel Wilks, who was a doctors' doctor, was firmly convinced of this association. On the other hand, this coincidence is so striking that there is a risk of exaggerating its frequency. Writers of complete text-books would of necessity swell this category and must therefore be disqualified. For example, Nothnagel died of what has from the toll it levies been called the doctors' disease—namely, angina pectoris—on which he was a recognised authority; but he was also the editor of a voluminous encyclopædia of medicine, and wrote on a number of other subjects. As examples of authors unconscious that the future would add a grim personal interest to their favourite professional subjects the following may be quoted: Laennec, who died from pulmonary tuberculosis: Sir William Gull, who, with H. G. Sutton, described arterio-capillary fibrosis, from cerebral hæmorrhage; Mikulicz from carcinoma of the stomach; S. O. Habershon, the author of a book on Diseases of the Stomach, of simple gastric ulcer; G. R. Fowler, an American surgeon, author of a "Treatise on the Appendix," and originator of the Fowler position, of appendicitis; Corvisart and Lancisi of heart disease.[2] The late Sir A. B. Garrod, who wrote in 1876 that, unlike Sydenham, he could not from personal experience describe the sensations of gout, became its victim, when 70 years of age, so his son the present Regius professor of medicine at Oxford tells me. Trousseau, whose clinical lectures covered nearly the whole field of medicine, pointed out that if thrombosis occurred in a case of gastric disease, carcinoma might safely be diagnosed; when himself ill he was visited on Jan. 1st, 1867, by his former pupil Peter, who, when thus calling to express good wishes for the New Year, had the painful experience of hearing his teacher say: "It is all up with me, the appearance of a patch of phlebitis last night leaves no loophole for doubt as to the nature of my illness." Trousseau was right in applying his diagnostic deduction to his own case; he lingered on for six months, dying at the age of 66 years on June 23rd, 1867.

Occupational Diseases among Medical Men.

Attention may be called to examples of what might be called occupational diseases among medical men; medical officers specially interested in infectious diseases, including tuberculosis, syphilis, and tropical affections, on which they may have written, are naturally liable to contract these diseases, and radiologists have suffered much in the past, especially from carcinoma. Those who have worked at the laboratory aspects of infections may fall victims to these diseases, and many examples might be given. Probably the best known are those cases in which the accident has rapidly proved fatal and so do not come under the category of those who have described the disease from personal experience. But of these martyrs to medical research the names of a few may be mentioned:—enteric fever: Allen MacFadyen, H. J. Tylden, L. Jenner; yellow fever: W. Myers; Rocky Mountain fever: T. B. McClintie; plague: Müller; spirillum fever: J. E. Dutton; glanders: J. H. Wells (1909). Another group contains those who have deliberately inoculated themselves with infective or probably infective material; thus J. W. Lazear allowed mosquitoes to bite him and by his fatal illness proved the transmission of yellow fever; the late Dr. P. T. Manson allowed infected mosquitoes to bite him, and by thus contracting malaria proved that they transmitted the disease; his death, however, was due to an independent accident; the late Dr. R. Cory, of St. Thomas's Hospital, frequently vaccinated himself with vaccine lymph from syphilitic infants and eventually became infected; and John Hunter[3] inoculated himself with pus from a case of gonorrhœa but developed syphilis, and was thus led to believe in the unity of venereal disease; it is, indeed, probable that his dramatic death from angina pectoris was due to syphilitic aortitis.

Great Names Connected with Special Diseases.

Bright, Addison, and Hodgkin—the great triumvirate of Guy's Hospital—did not suffer or die from the diseases so inseparably connected with their names. Bright died at the age of 69 after four days' illness attended with hæmatemesis, and the necropsy revealed pure aortic stenosis with healthy kidneys. He was known to have some cardiac affection, but it is said that inquisitive attempts to find out its exact nature were always frustrated by him; at consultations between several eminent physicians, including Bright, the problem was sometimes attacked by proposing to compare the patient's pulse with that of a presumably healthy man (Bright); but the erudite touch of the inquiring colleague was always skilfully evaded. About Addison's end kindly reticence drew a veil at the time of his death, but it appears that he became insane and jumped out of a window at Brighton when 67 years old. Hodgkin, who was pathologist, but never on the medical staff of Guy's Hospital, died of dysentery at Jaffa at the age of 68. Dr. Joseph Ignatius Guillotin (1738–1814), who was a zealous advocate of vaccination and the founder of a short-lived Académie de Médecine in Paris, did not, as poetic justice might well demand, have his head removed by the instrument to which his name is attached.

When giving descriptions of diseases from which they may happen to have had personal experience some writers record their own sensations under a modest periphrasis such as "a man known to us ..... whose heart stands work well in all other respects but in whom intermittence of the heart may occur for many days if he remain for an hour or two with many smokers. He dare not sit in a close smoking room or in a smoking carriage." Or "a case is known to the writer in which the patient suffered from a severe attack 18 years from the onset of the disorder (bilharziasis), which had been in abeyance for some years." The late L. G. Guthrie,[4] à propos of ophthalmic migraine, wrote: "In one case known to the writer permanent paralysis of the ocular sympathetic appears to have been the result of repeated migraine."

The accurate observations of medical men on their own diseases, in spite of the quip that "he has a fool for his patient," are interesting human documents, and may add to our knowledge of the earliest indications of disease. Such personal descriptions are of special value from the point of view of the subjective manifestations or symptoms as opposed to physical signs. The physical signs are best observed by the onlooker and may escape the attention of the patient. Thus L. P. Mark, for some 15 or 20 years, each day when he looked into the glass to brush his hair or to shave had a typical acromegalic literally staring him in the face,[5] as had been clear to his professional friends for years, and when 49 was spotted in a crowd by Professor Pierre Marie, who originally described the disease, while in London for a medical entente cordiale. His graphic account of his sensations and sufferings, on the other hand, give much fresh information, especially as regards the occurrence of exacerbations in the disease, or of periods which he calls the acromegalic state during which the symptoms, like the physical signs, are accentuated; these symptoms varied from malaise to complete incapacity to do anything and mental depression.

Julius Thomsen's[6] description (1876) of the disease of the

[1] A paper read before the St. Mary's Hospital Medical Society on Feb. 25rd, 1921.

[2] For an interesting paper on "Diseases of Great Physicians of the Past" see William Pepper (Tertius), Medical Library and Historical Jour., December, 1907; abstract in New York Med. Jour., 1908, lxxxvii., 231.

[3] Works of John Hunter with Notes, edited by J. F. Palmer, 1835, vol. ii., pp. 145, 417.

[4] Guthrie, L. G.: The Diseases of Children (Garrod, Batten and Thursfield). Vide also Clinical Journal, August 5th, 1896.

[5] Mark L.: Acromegaly, a Personal Experience. Baillière, Tindall, and Cox. 1912.

[6] Thomsen, J. (of Kappeln, Schleswig): Tonische Krämpfe (Ataxia Muscularis?), Arch. f. Psychiat., Berlin, 1876, vi., 702.

muscles (myotonia congenita) hereditary in his family first drew attention to this disease. This is the best, if not the only, example of a disease first brought to our knowledge by a sufferer, for it is not certain that John Bostock gave the first account of hay fever. Otherwise the nearest approach to such an original document is probably that by Dr. R. Druitt,[7] who gave a full description, especially as regards the early symptoms, of paroxysmal hæmoglobinuria under the title Paroxysmal Hæmatinuria in 1873, a year after the disease had compelled him to retire from active practice. But as far back as 1831 Elliotson[8] briefly referred to a case as connected with malaria, and in 1865, at the same meeting (on May 9th) of the Royal Medico-Chirurgical Society, G. Harley[9] and W. H. Dickinson[10] read papers on intermittent hæmaturia; Harley recognised that the red blood corpuscles were dissolved, but he believed that the underlying factor was hepatic derangement, apparently on account of the accompanying icteric tint; Dickinson, on the other hand, more nearly approached our present views in saying that we must be content to regard the disorder as something *sui generis* and the blood itself as the seat of the primary change. Druitt's symptoms began when he was 52, six years before his account of the disease was published, and lasted until his death in 1883 at the age of 68; he was the author of a once well-known handbook, "The Surgeon's Vade Mecum," which went through 11 editions.

Migraine, Asthma, and Gout.

The diseases most often described by medical patients are naturally those of a chronic character, and especially those with intervals of fair health between acute attacks of paroxysms, such as migraine, asthma, and gout.

Migraine, or sick headache, has the distinction of having been portrayed by more distinguished victims than has any other disease, even gout, and it is noteworthy that some of the most careful accounts of the visual phenomena have been given, not by medical men, but by the leading lights of pure science, especially astronomers, such as Sir G. Airy, Sir John Herschell, Sir D. Brewster, and Sir C. Wheatstone. In 1886 Hilton Fagge wrote: "I do not know of any other malady which within the present (XIXth) century has been the subject of two papers admitted into the Philosophical Transactions, as well as of communications to the Philosophical Magazine and other scientific publications in this country and abroad." It may therefore be said of it, as Sydenham feelingly remarked of gout, that it attacks more wise men than fools. Among well-known medical contributors to the literature of the disease are W. H. Wollaston, interim President of the Royal Society in 1820, who, however, threw up the profession in disgust when he was rejected as a candidate for the post of physician to St. George's Hospital in 1800; John Fothergill, the Quaker physician and philanthropist, of whom Benjamin Franklin said, "I can hardly conceive that a better man has ever existed"; Caleb Hillier Parry, the "distinguished old Bath physician"; Dr. E. Liveing, who wrote a classic on megrim (1873), Sir Samuel Wilks and Dr. Alexander Haig, a life-long sufferer until he dieted himself. Dr. Hubert Airy and Sir James Mackenzie have published coloured representations of their own spectra. Mackenzie mentions that the scintillations once came on when he was about to operate on a case of appendicitis, but in the concentrated attention given to the operation they disappeared, only to return about a quarter of an hour after the operation was finished.

Asthma and hay fever, being examples of toxic idiosyncrasies on which Dr. John Freeman has thrown the light of the laboratory, may be considered together. In 1819 John Bostock,[11] later Vice-President of the Royal Society, described his own case as a "periodic affection of the eyes and chest," and nine years later, now under the new name "Catarrhus aestivus, or summer catarrh," was able to collect 28 examples of a similar nature, but the only reference to a previous description of the disease that he could find was one by Heberden. But asthma, which it must be admitted is a rather vague term, as it may include many causes of dyspnœa, was previously well known. Thus Sir John Flover described his own case in his "Treatise on Asthma" (1698); and in Hutchinson's Biographia Medica (1799) it is stated that John Arbuthnot's "Essay on the Effects of Air on Human Bodies" (1733) was apparently the outcome of consideration of his own case, "an asthma which gradually increasing with his years became shortly after unmanageable and incurable."

Arbuthnot, in his political skit "The History of John Bull," originated this familiar personification of the English nation. "Bull in the main was an honest, plain-dealing fellow, choleric, bold, and of a very inconstant nature." It may be added that in one of his lighter touches the late Sir Victor Horsley described our three British institutions—John Bull, Father Christmas, and King Henry VIII.—as examples of fatty degeneration due to chronic alcoholism.

[7] Druitt, R.: Med. Times and Gaz., 1873, i., 403, 461.
[8] Elliotson: THE LANCET, 1832, p. 300.
[9] Harley, G.: Med. Chir. Trans., 1865, xlviii., 161.
[10] Dickinson, W. H.: Ibid., 1865, xlviii., 175.
[11] Bostock, J.: Med.-Chir. Trans., 1819, x., 161, and 1828, xiv., 437.

Another instance, certainly interesting on account of the correspondents, is to be found in a letter written from York on June 3rd, 1795, by Dr. Thomas Fowler (1736–1801) whose name is so familiar in Fowler's solution (liquor arsenicalis) to Dr. William Withering, of Birmingham, the introducer of digitalis, detailing his symptoms as those of angina pectoris and asking for advice; Dr. Withering endorsed the letter with his opinion that the disorder was spasmodic asthma. Turning now to later authorities, Hyde Salter wrote a treatise on asthma in 1859; C. H. Blackley, in his monograph (1873) on Catarrhus Aestivus or Hay Fever, refers to T. Wilkinson King, G. T. Gream, and W. P. Kirkman as fellow sufferers, and Trousseau[12] described his own experience; W. E. Steavenson in his published thesis for the M.B. at the University of Cambridge (1879), says, "I have never been prevented by an attack of asthma from going in for or completing any examination; but when completed and the strain on my mind relieved, it has always been followed the succeeding night and day by a severe attack."

Many famous medical men have suffered from *gout*, and some of them have made their experiences public. Thomas Sydenham (1624–1689), the English Hippocrates, was a chronic victim of gout, and towards the end of his life, when suffering from renal calculus and hæmaturia, brought out his Tractatus de Podagra et Hydrope (1685) Benjamin Franklin (1706–1790) was also plagued with gout and vesical calculus and wrote a curious pamphlet "A Dialogue between Franklin and the Gout." Dr. William Stukeley (1687–1765), not only a distinguished physician, but so eminent in archæology and druidical history that his friends familiarly spoke of him as the "Arch-Druid of this age," became so overpowered by the fatigues of his profession and repeated attacks of gout that he turned his thoughts to the church and was appointed to the living of All Saints, Stamford, in 1730, where he was treated by Dr. Rogers with his oleum arthriticum. The successful result of this external application induced Stukeley to publish "A Treatise on the Cause and Cure of Gout, with a New Rationale" (1734). It should, however, be noted that in addition to rubbing on the oil Stukeley adopted a proper regimen and left off the use of fermented liquors. A famous example of a physician recounting his own ailments is that of George Cheyne, who described his obesity, neurasthenia, and hyperchlorhydria and his cure in "The English Malady" (1733). In "An Essay of the True Nature and Due Method of Treating the Gout" (1720) he also drew on his own experience.

The late Sir Robert M. Simon suffered from *Ménière's disease*, and a graphic description of his symptoms from his own hand was published posthumously.[13]

Sir George Murray Humphry of Cambridge, had *phlebitis* on three occasions—in 1845 after right-sided pleurisy, in 1846 after typhoid fever, and again in 1851 after pleurisy. He laughed at those who kindly told him that he would die, and wrote his M.D. thesis on "The Formation of Clots in the Venous System during Life,"[14] recording his own case: "My attention was first called to it by its occurrence in a member of the medical profession, a delicate man."

Other Diseases, Infections, and Accidents.

Alimentary canal.—Merycism or rumination has been described by several medical sufferers: Nacke, Cambay, Blanchard, and Halliday.[15] J. H. Keay,[16] from frequent personal experience, insisted that the initial pain of *biliary colic*, presumably due to the entrance of a stone into the cystic duct, is felt in the back and not, as is commonly stated, in the right hypochondrium or epigastrium, and Dr. Kraus, of Carlsbad, expressed the same opinion on similar grounds. Professor Lewellys Barker,[17] in an article on the diagnosis of gall-bladder disease, mentions that when 8 years old he had enteric fever, and that 35 years later four gallstones giving cultures of *B. typhosus* were removed from his gall-bladder. Dr. E. A. Cockayne[18] detailed his own experience of catarrhal jaundice.

Cardiac and renal disease.—The late Sir W. T. Gairdner, who wrote much on the cardio-vascular system, gave an account[19] of his own symptoms in Stokes-Adams's disease. W. C. Wells (1757–1817), the famous author of "The Essay on Dew," suffered from dropsy and cardiac asthma; he wrote on scarlatinal and other forms of dropsy, pointed out that the urine contained albumin in scarlatinal and cutaneous dropsy, but not in primary hydrothorax or ascites. He noted that in some of his cases the kidneys were diseased, and thus prepared the way for Bright's generalisation; he anticipated Blackall, who subsequently elaborated the observations on the presence of albumin in the urine. James Jurin (1684–1750), the first physician to Guy's Hos-

[12] Trousseau: Clinical Lectures, p. 625, vol. i., 1868, New Sydenham Soc. [13] Vide Brit. Med. Jour., 1915, i., 53, 282. [14] Ibid., 1859, 582.
[15] Vide Brockbank, E. M.: Brit. Med. Jour., 1907, i., 421.
[16] Keay, J. H.: Medical Treatment of Gallstones, p. 75, 1902.
[17] Barker, L.: Jour. Amer. Med. Assoc., Chicago, 1920, lxxv., 1105.
[18] Cockayne: Quart. Jour. Med., Oxford, 1912–13, vi., 8.
[19] Vide "Life of Sir W. T. Gairdner," by G. A. Gibson M.D., pp. 138–152, 1912.

pital (1725–1732), suffered severely from renal calculus, and described his painful experience in his "Account of the Effects of Soap-Lye, taken Internally, for the Stone," published in 1740.

Infections.—Murchison, who had typhus twice, graphically described his own sensations and delusions during the delirium of the disease, and quoted similar personal accounts by Hildenbrand and Gueneau de Mussey. Benjamin Rush, "the American Sydenham," after advocating bleeding and purgation with good results in yellow fever, contracted the disease, had his own treatment, and recovered. Surgeon-General G. M. Sternberg, who investigated many outbreaks of yellow fever, and wrote much, especially about the ætiology and prevention of the disease, had an attack after the third outbreak and was as energetic as ever in advocating measures for its prophylaxis. Sir James Paget in his account of his illness contracted from examination of a patient dead of pyæmia remarked, "Sir William Lawrence used to say that he had not known anyone to recover on whose case more than seven had been consulted. Our art has improved. I had the happiness of being attended by ten." In recording his own experiences as a case of staphylococcic infection Sir Lauder Brunton [20] noted that the pain was worse after meals, when hydrochloric acid was being absorbed from the stomach, and that relief followed the ingestion of sodium bicarbonate and its local application to the pustule; he referred to the diminished alkalinity of the blood, but did not use the term acidosis, which, though invented, was not then in popular parlance. Alexander Ramsay (1754–1824) who, according to some, was a compound of personal deformity, immense learning, uncontrollable temper, and inordinate vanity, wrote "Personal Experiences from the Bite of a Rattle-snake." [21]

Tuberculosis has naturally attracted its medical victims to its study, and has recently been responsible for a number of medical officers to sanatoriums. Sir Andrew Clark, when young, was gravely ill with tuberculosis, and when given an appointment at the London Hospital in 1853 was not thought likely to survive a year; no doubt his own condition led him to undertake inoculation experiments with tuberculous material, a subject to which Villemin's researches were then (1865) calling much attention; but his work was interrupted by an attack of hæmoptysis. He also did much to establish the existence of a non-tuberculous destructive disease of the lung under the name of fibroid phthisis or, as it is now called, chronic (interstitial) pneumonia. E. L. Trudeau developed pulmonary tuberculosis in 1871 and was the pioneer of the open-air treatment of the disease at his sanatorium at Lake Saranac, in the Adirondacks, where R. L. Stevenson was for a time, and where, according to E. V. Lucas [22] simplified spelling is in vogue and "that most august and mysterious of the functionaries of life, the physician, is able to watch his divinity dwindle and his dignity disappear under the style Fizisn." Dr. James Hughes Bennet went to Mentone for disease of the lungs and was the chief agent in establishing Mentone as a health resort; he wrote a book on "The Treatment of Pulmonary Consumption by Hygiene, Climate, and Medicine."

Rupture of his tendo Achillis about 1762 led Alexander Monro, primus (1697–1767) of Edinburgh, to record his accident; and John Hunter's similar experience while dancing in 1768 inspired him to investigate experimentally the healing of tendons in dogs. Percivall Pott's fracture, due to a fall from his horse in 1756, has kept his name in perpetual recollection.

Lastly, most of the writers on old age and its infirmities, such as Cornaro, Sir Anthony Carlisle, Charcot, Sir George Humphry, Sir Hermann Weber, and Dr. R. Saundby, have been approaching the sere and yellow. A few dying physicians have recorded their experience until the pen slipped from their fingers, and it is difficult to find a more comforting last word than that of the great William Hunter, "If I had strength enough to hold a pen, I would write how easy and pleasant a thing it is to die."

HEALTHY FEET.

ON April 6th a lecture on "Healthy Feet" was delivered at the Institute of Hygiene by Mr. W. H. Trethowan, who said that during and after the war, as surgeon to one of the great military orthopædic hospitals, he had had an extended opportunity for noticing how frequently deformities and disabilities of the feet contributed to the C3 element enrolled in the new army, and also the effect of these foot conditions on active service. A great number of cases of so-called "trench feet" were reported, but when, from the cases thus grouped, those really due to frost-bite were eliminated, the remainder were ordinary mechanical disabilities common in civil life, such as flat-feet, too arched feet, clawed toes, hammer toes, and similar troubles. Apart from frost-bite, he had never been able to convince himself that such a disease as trench feet existed.

It was, he continued, impossible to find in a civilised adult a perfect foot—one of ideal shape, which would do its work properly and gracefully, and give no trouble. To keep the feet healthy it was necessary to "catch them early," and the most effective work for reform can be carried out by the provision of proper footwear for children. Growing children must not be on their feet all day long, and should not be required to follow laborious occupations, entailing heavy lifting. Standing about was more harmful than prolonged vigorous walking, and in any collection of women, such as nurses, who had to stand about during their work, foot troubles were numerous.

Flatness and Falling-in of Foot.—Height of Heels.

Flat-foot was the commonest of such troubles. But generally, and nearly always in children, the first trouble was not really flat-foot—that is, a giving way of the long arch—but a falling-in of the foot, just below the ankle-joint, a condition often referred to as weak ankles, leading to more strain on the inner border of the foot, and, later, to the arch itself giving way. The best exercise for flat or weak foot was correct walking, developed until it becomes automatic. Slight turning out of the toes was correct when standing easy, but in walking the feet should be kept parallel. The essential use of a boot was to protect from over-strain the ligaments which bind the small bones together, and consequently the boot or shoe should correspond to the shape of the foot. Instead of the shoe fitting the foot, however, it was unfortunately the case that the foot is compelled to adopt the conventional standard shape of the shoemaker, narrower than the actual human foot, producing a pointed toe portion in which the great toe was cramped, turned outwards, and not permitted to move. So-called squared toes were a delusion and a snare; it was not the part projecting beyond the toes which mattered, the important point being that none of the toes must be subjected to side pressure. A good shoe should also have a well-curved and stiffened waist.

With regard to heels, Mr. Trethowan said the Cuban was the most satisfactory for general use, the Louis heel being bad on account of its curved mechanical shape and inefficient support, and also because it weakened the whole sole of the shoe. In a strong foot the lower, brogue heel could be used. Children with normal feet did not require much heel. Women, however, favoured high heels, and, while there was no doubt that some did so for purely cosmetic reasons, it was certain that the majority of women wore high heels as a response to the relief afforded to the ligaments of the foot. Women, being hampered by skirts, could not get such freedom of movement in the hips as men are able to do, and it might be from this cause they needed the more efficient support afforded by heels. The action of the foot in man was not nearly so marked as in women, as men propelled themselves with the hip movement of long strides, while women walked more with their feet. It was a universal and traditional idea that the majority of troubles occurring in the feet are the evil results of the use of heels, but the anatomy and movements of the foot showed fully that the strain on the long arch must lessen in proportion as the heel is raised; this was the experience of the vast majority of women, in spite of medical advice to the contrary. The most important measure in giving relief in cases of weak or overstrained feet was to raise the height of the heels, and not to lower it, as was nearly always advised. The height of the heel for remedial purposes should not exceed 2½ inches, and in house-shoes should not be less than 1¼ inches. Naturally, the height should do no more than afford relief. In cases of overstrained feet slippers must be avoided. Heels not less than 1¼ or 1½ inches in height were suitable for general use in healthy feet.

Selection of Footwear.

Most ready-made boots, Mr. Trethowan said, failed miserably in the support afforded to the inner border of the foot, and this fact, together with waists that are thin and unyielding, and which bulge downwards after use for two or three weeks, was largely responsible for the inefficient support and breakdown of the foot. Where such an evil arrangement was combined with a flat heel, the shoe is of the worst description. The majority of people habitually wore shoes too narrow across the toes and the balls of the toes. Up to a point, just behind the balls of the toes, the snugger and narrower the shoe the better, for a good tight grip of the instep was very desirable.

In selecting shoes important points to be borne in mind were length, breadth of soles, the pointing inwards of the toe portion or straight inner border, and the roominess of the toe portion of the upper. In conclusion, Mr. Trethowan pointed out that pressure effects began very early in children, and that a single pair of ill-fitting shoes might be the cause of a considerable degree of permanent deformity. Socks and stockings were of some importance also, and were often too short, narrow, and made of unyielding materials. Socks, in order not to have any deforming effects, should be large, not pointed at the toes, and made of material that will readily expand.

[20] Brunton, L.: St. Bart.'s Hosp. Rep., 1903, xxxix., 227.
[21] American Medical Biographies (Kelly and Burrage), p. 951, 1920.
[22] "From an American Note-book," Times, Sept. 24th, 1920.